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OCTOBER 1954

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*The House Our Readers Asked For
—Page 145*



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Number 4

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this month's cover

WHEN ARCHITECT Rudolph A. Matern submitted his preliminary sketches and floor plans for "The House You Asked For" he included a rough drawing showing the outdoor-living area of the home. "This might not be a bad angle for the cover," wrote Matern. "What do you think?" We thought it looked pretty sharp and so did Robert Korta, staff illustrator, who did the finished painting you see on the cover. That tree you see in the patio across from the glassed-in breakfast area of the kitchen is actually growing near the Korta home in Hinsdale, Ill. For a full-color treatment of this house and the story behind it turn to page 145

Information not listed on articles in the index, starting on page 12, frequently is listed in the WHERE-TO-FIND-IT LIST, which is available to readers without charge. A copy may be obtained by writing to the Bureau of Information, Popular Mechanics, 200 E. Ontario, Chicago 11, Ill.

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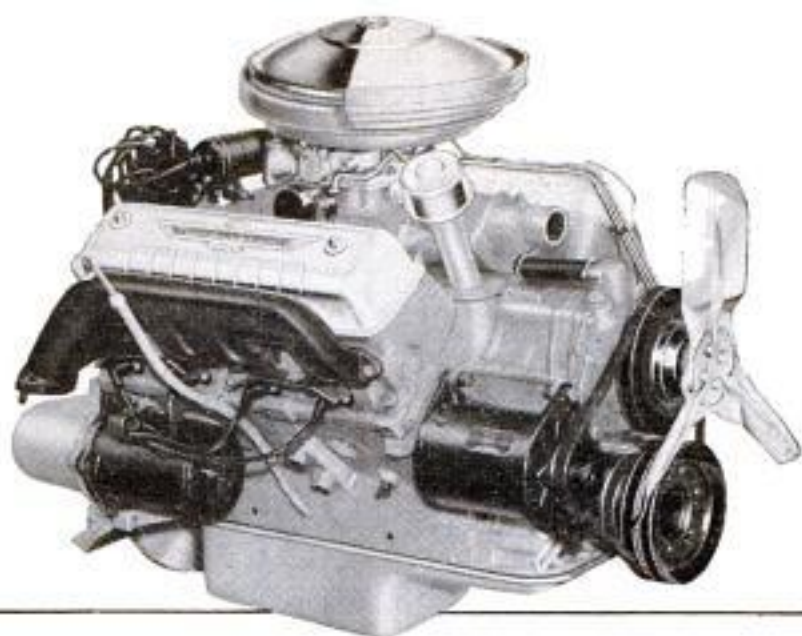
If you've seen this sleek-looking number on the road, chances are you haven't forgotten it. A mere 34.2 inches from door top to tread, with a 102-inch wheelbase, this all-American-built personal car is already influencing future automobile design. And appearance is only half the story. Beneath the Thunderbird's beautiful all-steel body you'll find fresh new features. For example, the Thunderbird's

steering wheel telescopes in or out a full three inches. The Astra-Dial Control Panel includes a tachometer, signal lights for oil and generator, and a clock with sweep second hand. The Thunderbird answers to the controls with nimble responsiveness that is wonderful to experience.

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in this corner.....

THE EDITORS



"It was certainly one of the most challenging and interesting jobs I ever tackled," says Architect Rudolph A. Matern, designer of "The House You Asked For" featured on the cover and pages 145-150. "When I saw that mountain of questionnaires filled out by *Popular Mechanics* readers on the kind of a house they wanted



I almost got cold feet. I really got a kick out of the big majority that stated their preferences for basements in no uncertain terms because I have been a basement fan for many years. I also enjoyed planning the house in such a way so those with minority preferences would like it, too. That was the hardest part."

Matern, who is nationally famous for his attractive ranch houses, lives and works in Jamaica, Long Island, N. Y.

To the Editor:

I wish to compliment you on your very fine article entitled "Slow Down and Live Longer," as it appeared in the July issue of *Popular Mechanics*. I am glad to see that a magazine of your circulation is taking up the fight against this "highway killer."

I have been interested in photography of all sorts for quite some time, and have followed the results that the Markel Insurance people have had in the use of photography in cutting down the number of accidents for their own company. I am glad to see law enforcement agencies putting

(Continued to page 8)

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P-10

(Continued from page 6)

this same method into practice and getting equally good results from its use.

I am a clerical worker for the Drivers License Division of the Iowa Highway Safety Patrol and, after spending six days a week on the road for the past three years, I have become very interested in cutting down these "accidents" on our streets and highways. It is very essential that all law enforcement agencies get tough with the people, and use every device available to curb this climbing death rate.

W. R. Baughman,
Oskaloosa, Iowa

To the Editor:

Enclosed please find photographs of my new invention for which a patent has just been issued. I made up this unit by hand and installed it in a home where it has been in use every night for over two years. I am



68 years old and have no money to finance the manufacture other than by hand . . . Maybe I will live long enough to see something come of it. This bed is perfect for apartments, motels, mountain cabins and for private homes where an extra bed is needed and room is scarce.

Victor R. Will,
3108 X St.,
Sacramento 17, Calif.

(Continued to page 12)

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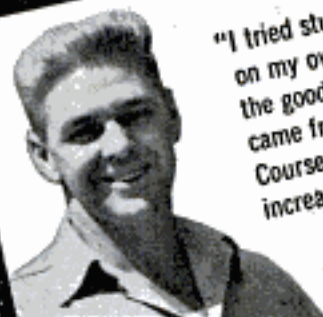
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President
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As part of my Communications Course I send you parts to build low-power Broadcasting Transmitter at left, and other equipment. Use it to get practical experience. You put this station "on the air," perform procedures demanded of station operators. An FCC Commercial Operator's License can be your ticket to a bright future. My Course trains you to get your license. Mail Coupon now!



Television Is Today's Good Job Maker

Television now reaches from coast-to-coast. More than 25 million Television sets are already in use and require servicing; thousands more sets are being sold every week. About 200 TV stations are now on the air with hundreds more being built. This means new jobs, more jobs, better pay for trained men. The time to act is NOW! Start learning Radio-Television servicing or communications.

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Nothing takes the place of PRACTICAL EXPERIENCE. NRI training is based on LEARNING BY DOING. You use parts I send to build many circuits common to Radio and TV. You build the modern radio at right. Use Multi-tester you build to make money fixing sets. Many students make \$10, \$15 a week extra fixing neighbors' sets in spare time, starting soon after enrolling. All equipment I send is yours to keep.



Make Extra Money in Spare Time While Learning

Keep your job while training. Many NRI students make \$10, \$15 and more a week extra fixing neighbors' Radios in spare time. The day you enroll I start sending you special booklets that show you how to service sets. Multi-tester you build helps discover and correct Radio troubles, gives PRACTICAL EXPERIENCE on circuits common to radio and TV. Mail coupon today.

I Trained these Men at Home



**Laborer
Finds
Success in
Radio-TV**

"I was a laborer with no future. Now I have a position that pays well. My spare time servicing pays good money, too. Thanks to NRI."—Robert Ford, Johnstown, Pa.



**Switched
to TV
Servicing**

"I recently switched from studio work and am now holding a position as TV service technician. Enjoy my work more and more."—Norman Ward, Bridgfield Park, N. J.



**Paid for
Course, Car
in Spare
Time**

"By the time I graduated I had paid for my course, a car and testing equipment. I can handle any job in Radio-TV."—E. J. Streltenberger, New Boston, Ohio.



**\$10 to \$15
Week
Spare Time**

"Four months after enrolling, was able to service Radios . . . averaged \$10 to \$15 a week spare time. Now have full time, business."—W. Weyde, Brooklyn, N. Y.



**Employed as
Transmitter
Operator**

"A former employer recommended NRI training to me. Now employed as transmitter operator in Harrisburg."—Albert Herr, New Cumberland, Penna.

AT HOME for Good Jobs in TELEVISION

There is Success-Good Pay-Security for You in America's Fast Growing Industry



NRI Training Leads to These Jobs in RADIO-TELEVISION

BROADCASTING

Chief Technician
Chief Operator
Power Monitor
Recording Operator

SERVICING

Home and Auto Radios
Television Receivers
P.A. Systems

MANUFACTURING

Design Technician
Service Manager
Tester
Research Assistant

SHIP AND HARBOR RADIO

Chief Operator
Radiotelephone Operator
Assistant Operator

GOVERNMENT RADIO

Operator in Army, Navy, Marine Corps
Airways Operator
Forestry Dispatcher

AVIATION RADIO

Transmitter Technician
Airport Transmitter Operator

TELEVISION

Pick-up Operator
Television Technician
Remote Control Operator

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DO YOU want good pay, a job with a bright future, security? Would you like to have a profitable business of your own? If so, find out how you can realize your ambition in the fast-growing RADIO-TELEVISION industry. Even without Television, the industry is bigger than ever before. Just think, over 125 million home and auto Radios, 3000 Radio Broadcasting Stations, plus 25 million Television sets and about 200 Television Broadcasting Stations. Expanding use of Aviation and Police Radio, Micro-wave Relay, Two-way Radio for busses, taxis etc., are making opportunities for Servicing and Communications technicians and FCC Licensed Operators.

My Training Includes Television

You get practical experience by working on circuits common to both Radio and Television. My graduates are filling jobs, making good money in both Radio and Television. Many NRI trained men start their own Radio and Television servicing business with capital earned in spare time. Let me show you how you can be your own boss; earn \$10 to \$15 a week extra even while still learning. Now is the time to get ready for success in Radio-Television. Coupon below brings you Actual Lesson and 64-page book.

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What will YOU be doing one year from today? Decide now that you are going to know more and earn more. ACT NOW. Send the coupon below NOW for my FREE DOUBLE OFFER. You get Actual Servicing Lesson. Also my 64-page Book, "How to Be a Success in Radio-Television." Read what my graduates are doing, earning, see equipment you practice with at home. Mail coupon now. Send in envelope or paste on postal. J. E. SMITH, President, Dept. 4KA, National Radio Institute, Washington 9, D. C. Our 40th Year.

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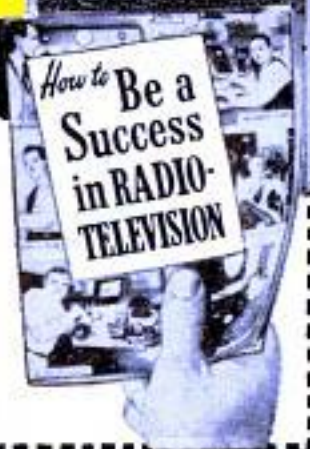
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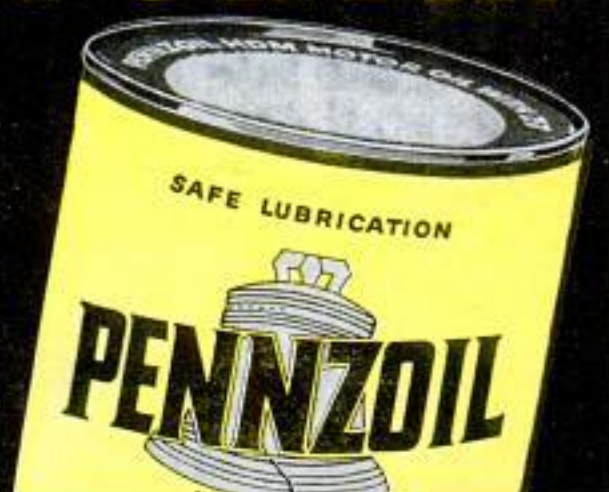
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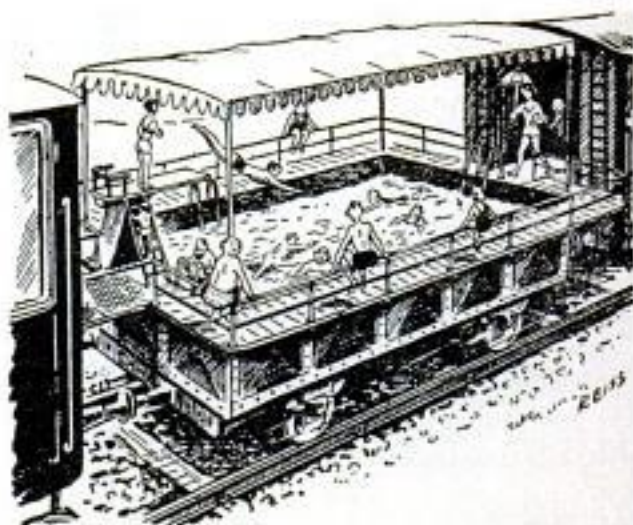
To the Editor:

I was somewhat surprised to see the story on Washington State Police in your July issue, which duplicates our endeavors with the traffic camera. I am assured that North Carolina alone is the first and only state using the Markel traffic camera in traffic-enforcement work exclusively.

Bill Crowell,
Director, Public Relations,
Department of Motor Vehicles,
Raleigh, N. C.

Swim While You Ride

Why wait until you reach that vacation spot? You can swim on the train, if the suggestion of an artist for the German



Federal Railway is adopted. He proposes a canopied car with a swimming pool, diving board and all the comforts of a municipal pool. Waves, if any, would be supplied by the motion of the train.

To the Editor:

Your auto edition in February needs special mention. It is the best auto issue produced so far. It covers all the automotive news of the year. I especially appreciate the feature on "What's New in '54." The parade of '54 cars will be better if there is also a parade of all the "dream cars" which are so much in the limelight nowadays. May I suggest that a special edition of all the dream cars be published? The Classic Cars are worth noting.

I must also congratulate you for the excellent article on the University of Mexico in your June issue.

Lee Ah Tong,
Muar, Johore, Malaya

☐ A new electronic "brain" scores students' tests at a rate of 1400 per minute.

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the Patent Laws. For that reason, unless the inventor is familiar with patent matters, he should engage a competent registered patent attorney or agent to represent him. We are registered to practice before the U. S. Patent Office and are prepared to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

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THAT'S NO GIRAFFE!!

IT'S ANYFACE-CRIMINAL MASTER OF 1,000 DISGUISES!

SOB!!- MY IDEAL, FOSDICK, HAS GONE BALMY!!

HA!! NO REAL GIRAFFE'D HAVE SUCH DRY, MESSY HAIR!! HE'D USE WILDROOT CREAM-OIL!!

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Inventors

The following are the usual preliminary steps to take toward patent protection.

You are advised first, to make a disclosure of your invention. Date, sign and have this document witnessed by two or more persons who are capable of understanding your invention. The "Evidence of Invention" form mentioned below, we offer as a convenience in making your disclosure and in starting action leading toward patent protection.

Mail your disclosure to the registered patent attorney or agent whom you select to assist you, together with a letter authorizing him to conduct a

preliminary search among previously granted U. S. patents for similar types of invention. He then prepares for you a report on the probable patentability of your invention and, if the report is favorable, recommends the further course you should take.

This firm is registered to practice before the U. S. Patent Office and is available to assist you in the preparation and prosecution of patent applications. We shall be glad to send you without obligation, the "Evidence of Invention" disclosure form mentioned above and our instructive booklet, "Patent Protection for Inventors".

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Frank Williams
FRANK E. WILLIAMS, M.E.
Inventor of Life-Time Spark Plug

WHAT DOES 17 PT. FIRING MEAN? Note construction closely. A completely circular firing area consisting of four concave segments (electrodes). Distance to the center electrode being equal at all points, electricity has the property of arcing from the coldest point. Electricity also arcs more readily from the apex of two planes than from the face of a flat metallic surface.



See above that there are 16 apex (places where two planes meet) on the outer circular electrode of the LIFE-TIME Spark Plug all exactly the same distance from the center electrode!

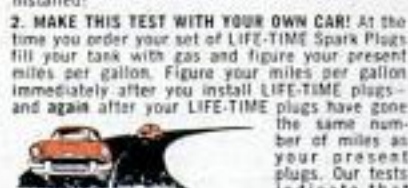
17 ARC POINTS—360 DEGREES Normal heat and spark erosion are spread around the entire 360 degrees of the circular electrodes and around the entire circumference of the center electrode! Firing simultaneously from 2 or more of the 16 outer points, LIFE-TIME plugs give a larger spark for more complete combustion.

FULL ROTATING SPARK ALLOWS OVERALL COOLER ELECTRODE TEMPERATURE FOR GREATLY INCREASED LIFE. This allows the use of a hotter spark to avoid fouling, yet the cooling effect of the multiple electrode system (plus superior heat conductivity) minimizes the common faults of burning, erosion, blistering and insulator failure.

A larger, more powerful spark every time gets more miles from every gas dollar you spend. Giving better gas economy, increased power, acceleration and top speed. Compare this principle with the conventional 2-point spark plug design.



1. MAKE THIS TEST WITH YOUR OWN CAR! Time your acceleration from 0 to 60 mph with any other spark plug. Then time 0 to 60 mph with LIFE-TIME Spark Plugs in your car. This test performed in a hopped-up 1952 Merc cut 2 full seconds of the time when LIFE-TIME plugs were installed!



2. MAKE THIS TEST WITH YOUR OWN CAR! At the time you order your set of LIFE-TIME Spark Plugs fill your tank with gas and figure your present miles per gallon. Figure your miles per gallon immediately after you install LIFE-TIME plugs—and again after your LIFE-TIME plugs have gone the same number of miles as your present plugs. Our tests indicate that both tests with LIFE-TIME Spark Plugs will show from 4% to 13.5% greater gas mileage than with any conventional spark plug.

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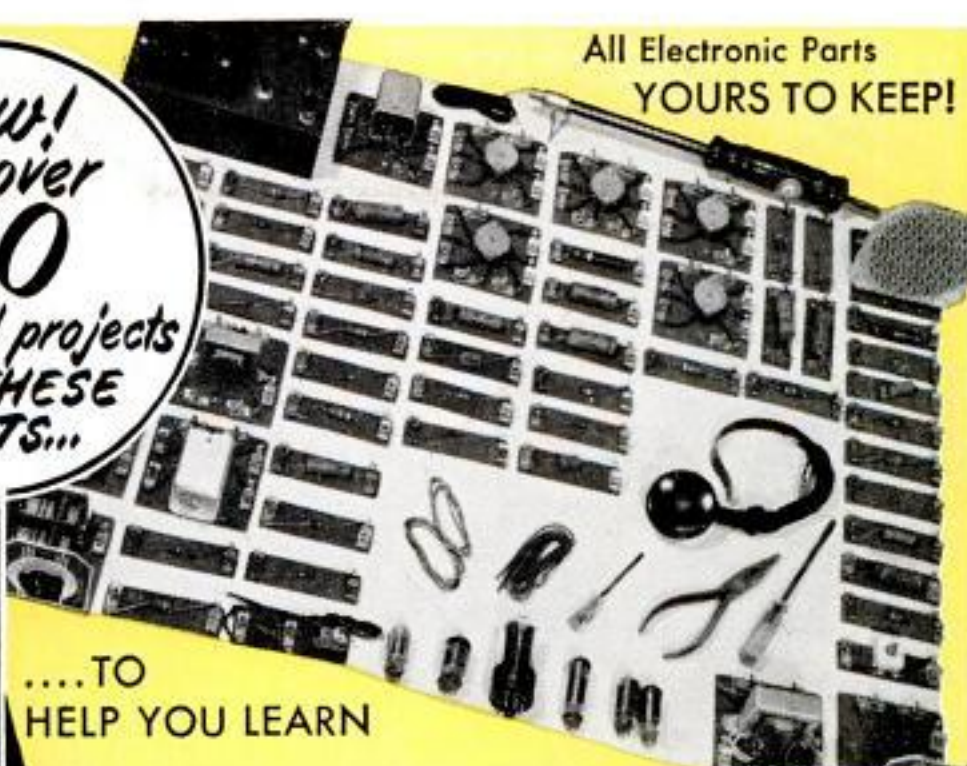
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Scientists Skin Dive for Oil

Skin-diving geologists operating off the California coast are turning up evidence that may lead to major oil discoveries. Clad in bathing trunks and aqualungs, a six-man team known as the Geological Diving Consultants of San Diego has already discovered deposits of phosphorite and manganese. The scientists have also discovered oil seeps that vary in size from trickles to extensive underwater tar pits—even exceeding in size the famous La Brea Tar Pits of Los Angeles. "Thousands" of gas seeps have been discovered during the explorations. The hardy group, which operates at depths ranging down to 150 feet, has made more than 1000 dives for local oil companies since its formation late last year.

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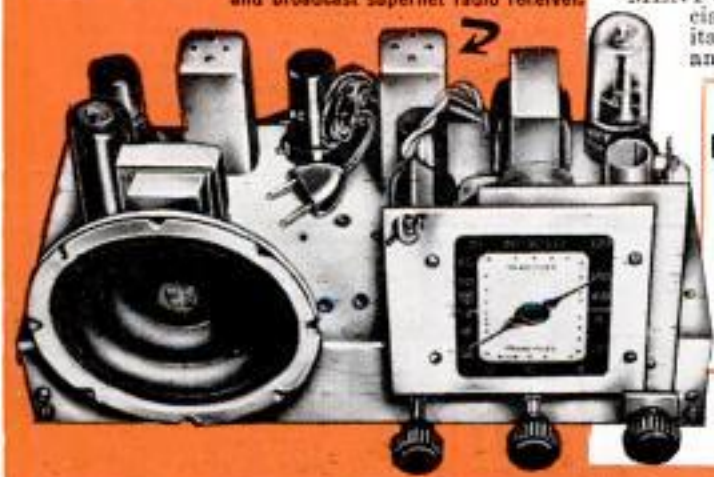
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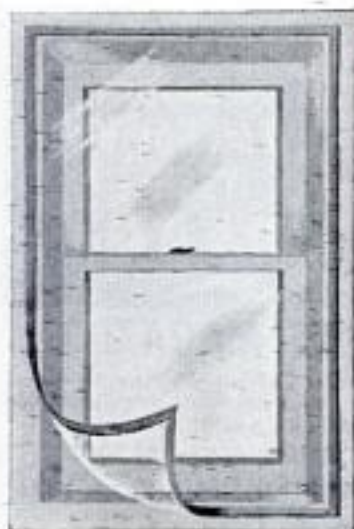


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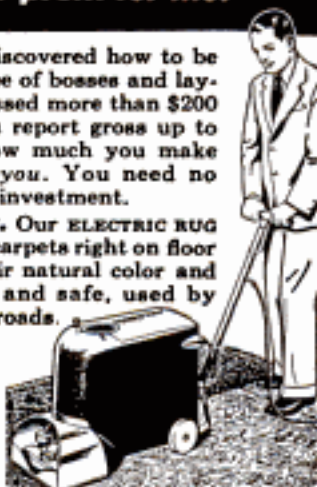
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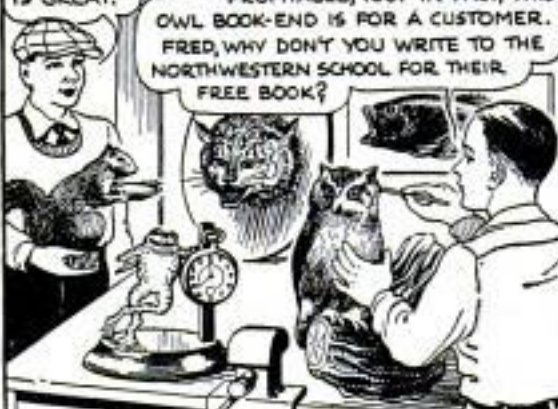
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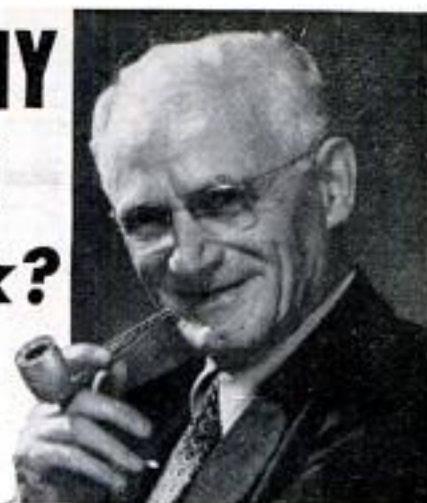
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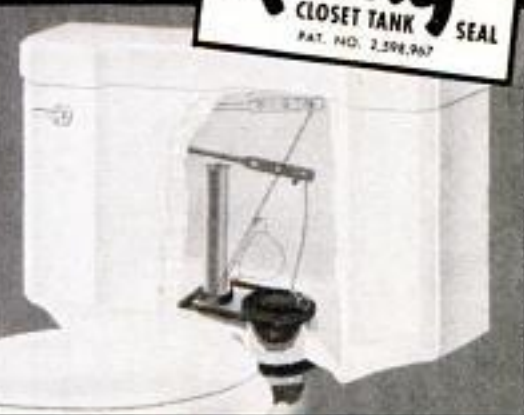
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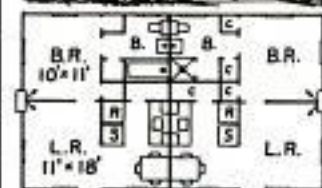


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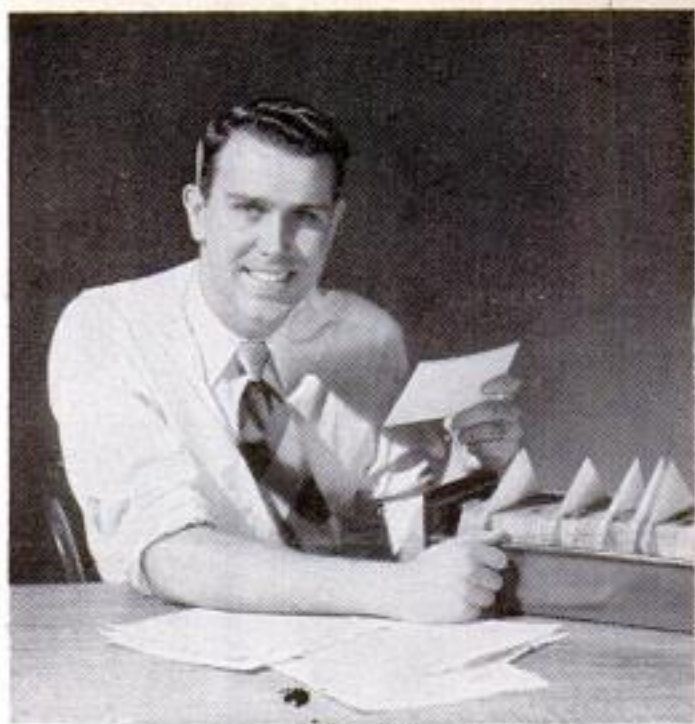
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830 MIXED U.S. old-new 25c. Lists. Weatherly, Medina, Ohio.

BARGAINS Galore. Low priced approvals. Schur, Box 117, Williamsville 21, N. Y.

25 FRENCH Colonies 5c; approvals sent. Adler, 367-M Park Ave., Newark 7, New Jersey.

12,000 PENNY Approvals waiting for you. Many from exotic countries, pictorials, airmails, new issues. Tilbury, Box 862, Newark 1, N. J.

FIJI Bicolored health set, 5c. Approvals. Pleasure Stamps, 1865P—52nd, Brooklyn 4, N. Y.

96 PAGE Illustrated U. S. price list. Send 10c, cost of mailing. DeLisle, 69 Plaza Shopping Center, Fresno 1, Calif.

ANTIQUES, RELICS, INDIAN GOODS, CURIOS

UNITED States silver dollars, \$1.75 each, postpaid. Guaranteed genuine. Liberty head or Peace. Carry one as lucky pocketpiece. Fred Birch, Box 634, Deer Lodge, Montana.

DARK Africa genuine native handmade ivory, ebony carvings. Marvelous gift. Particulars 25 cent stamp. Vessiere, P.O.B. 2482, Leopoldville, Belgian Congo.

6 PERFECT Arrowheads \$1.00. List free. Charles Palmer, Rd 1, McKeesport, Penna.

ANTIQUE Firearms, swords, curios, il-lustrated catalog 35c. Westbrook, 738 Royal Street, New Orleans, Louisiana.

KQWUITschuerbellerscken: Am selling 600 historical firearms, 25,000 pre-historic Indian relics, 20,000 historical cartridges, 10,000 coins, mounted birds, deerheads, bayonets, frontiers, violinwood, Kentuckies, Agates, fossils, gold dollars. Profusely illustrated catalog 35c. Heike, Englerock, Wenona, Ill.

SEND Dollar for full color hand printed picture, Indian Dancer. Free list. Tewa Enterprises, 724 Canyon Road, Santa Fe, New Mexico.

6 GEM Arrowheads \$2.00. 4 fine arrowheads \$1.00. Notched tomahawk \$1.00. List free. Lear's, Glenwood, Arkansas.

4 SELECTED Arrowheads \$1.00. List 5c. H. Talburt, Calico Rock, Ark.

PRECIOUS STONES, MINERALS

FIND Tungsten, mercury, uranium with Mineralight. Free brochure. Write Dept. PM8, Ultra-Violet Products, South Pasadena, California.

5 RARE Minerals from Angelfalls area Venezuela \$5. First quality industrial diamonds 1/5 carat \$7.50. Apply for larger industrial and gem qualities and further information PO Box 2585. Payments only by cheque to Royal Bank of Canada Account Vanheyningen & Vandeputte, Consulting Geologists, Caracas, Venezuela.

TWO Gem ruby garnets, India 1/2", each \$1.00 prepaid. Eckert Mineral Research, Florence, Colorado.

JOIN The thousands whose hobby is gem cutting, jewelry making, mineral collecting. Send only \$3.00 today—for 12 monthly issues of national how-to-do-it magazine. Sample copy 25c. Gems & Minerals, Dept. A-10, Palmdale, California.

"GENUINE" Red Arizona rubies (garnets). Send quarter for packet. Bitner's, Box 1025B, Scottsdale, Arizona.

TEN New Mexico minerals \$1.50, six fluorescent \$1.00, fools gold 25c. Free literature. Minerals, Winston, New Mexico.

URANIUM, 1.00% U3 O8, \$1.00. Instantly determine ore value by comparison with this accurate sample. Uranium, 22319 Kathryn Ave., Torrance, Calif.

GEMCUTTING, Silvercraft authority. Illustrated magazine tells how. Cut rocks, make jewelry. 150 ads illustrating equipment, offering gems for collectors, cutters. Postal brings literature. Lapidary Journal, Drawer B, Palm Desert, Calif.

GEMSTONES, Mineral specimens. Every variety. Lowest prices. Free booklet. Plummer's, 4720 Point Loma Ave., San Diego 7, Calif.

SAPPHIRE, Topaz, tourmaline, garnet, peridot, 5 uncut gem specimens, \$1.00. O'Brien's, 1116M Wilcox, Hollywood 38, Calif.

AGATES, Jade, gems. Free list. North West Gems, 2819 North Warner, Tacoma 7, Washington.

HOBBIES AND COLLECTIONS

WANTED: Cigarette, tobacco cards. Write Charles Bray, East Bangor, Penna.

50 DIFFERENT Army embroidered patches \$1. Other bargains. Insignia Mart, 702A Broadway, New York 3, N. Y.

GENUINE Virginia fairystones. Collection, including legend, \$1.00. Virginian, Box 862, Inverness, Florida.

HOBBY Printers—Join non-profit American Amateur Press Association, 822 South Orleans, Tampa 6, Florida. Hobby papers exchanged.

FOREIGN Medals, clearance catalog 10c; 37 American different emblems \$1.00. Hobbyguld, 550B—5th Ave., New York.

VARIOUS Seashells from American, foreign shores. Big assortment \$3.00. Hobbyshells, 1133 S.W. 9th Rd., Gainesville, Fla.

UNUSED Matchbook covers, 100 differ-ent \$1.00. 36 page catalog 25c. Matchcover album \$3.00. Charles Edelman, 1311C East 84, Cleveland 3, Ohio.

NAZI Medals, Campaign ribbons, il-lustrated lists. Big packet, \$1.00. Medcrafts, 1923 34th St. S. W., Calgary 2, Canada.

NEW—15 Different match covers 10c. Box 202, Rochester 1, N. Y.

INVENTING Can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 40-E 631-E St., N.W., Washington 4, D. C.

MILITARY Miniatures: U. S. Marines, American Revolution, Civil War, Custer's Cavalry. Illustrated catalog 25c. Bussler Miniatures, 59 Russell Park, Quincy 69, Mass. Dept. B.

WORLD'S Smallest Bible 50c. Three, \$1.00. Empires, Box 301, Amesbury 2, Mass.

ASSORTED Shells, Sea horse pack \$1. Box 716, Manhattan Beach, Calif.

CAMERAS, PHOTO SUPPLIES

OIL Coloring photographs—A fascinat-ing hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Free booklet. National Photo Coloring School, 835 Diversey Parkway, Dept. 343C, Chicago 14.

BUY Wholesale—Photo equipment, appliances. Discounts to 45%. Free catalog. Camera Shoppe, Box 601-m2, Mount Vernon, N. Y.

20 TO 40% Discount. Everything photographic. Dart, 3812E Atlantic Avenue, Brooklyn 24, New York.

35 MM Slides, World War II, 100 as-sorted black and white. Only \$5. Abbe, 503 Fifth Ave., New York 17, N. Y.

BUY Wholesale nationally advertised cameras, photo supplies, thousands other products at big discount. Free "Wholesale Plan." American Buyers, 629-RR Linden, Buffalo 16, N. Y.

DARKROOM Plans, \$1. Industrial Photographic Technicians, Box 2601, University Station, Wichita 14, Kansas.

RANGE Finder lens assemblies, new, government cost \$200.00—\$9.95 while they last, prepaid. Check or money order with order. Coronet Enterprises, Box 364, Rochester, New York.

TRIPOD—Shirt pocket size tripod. Weight 4 oz. Fits all cameras. Money back guarantee, \$3.00 postpaid. Flite-Wate, 929 13th St., Bellingham, Wash.

AERIAL Cameras, K-21, less lens and filters, original government package, \$700.00 value for \$39.50; 3 for \$100.00. Operates automatic or manually. Shipping weight 60 lbs. Check or money order with order. Coronet Enterprises, Box 564, Rochester, New York.

BASS Says: Quality cameras since 1910. When in Chicago visit the camera cross roads of the world, or write us for your favorite equipment, new or used. Satisfaction guaranteed. Bass Camera Co., Dept. AG, 179 W. Madison St., Chicago 2, Ill.

PHOTOGRAPHY For pleasure or profit. Learn at home. Practical basic training. Long established school. Free booklet. American School of Photography, 835 Diversey Parkway, Dept. 3432, Chicago 14.

PHOTO FINISHING

TWO Beautiful prints from each picture on roll, 8 exposure 35c, 12 exposure 45c. Thirty-three years of satisfied customers. Quick service. Lens Photos, Dept. J-4, Janesville, Wis.

SENSATIONAL! 8 Jumbos, 25c; 12, 35c, 35mm.-36 exposure, \$1.00. Guaranteed quality. With this ad only. Flash-Photo, Box 36B, Brooklyn 4, N. Y.

PAST. Same day service! 8 oversized prints only 35c; 12-50c, 16-65c. Satisfaction guaranteed. This ad worth 10c toward first roll. Trial offer only! PicSure, Box 899-B, Philadelphia 5, Penna.

PROFESSIONAL Enlargements: Twenty 4x8s or ten 5x7s or five 8x10s \$1.00 from negatives or photo. Artshop, PM246, Sweetwater, Texas.

SPECIAL Offer—8 Jumbos 25c; 12, 35c. with this ad. Western Photo, PM104, Box 298, San Francisco 1, Calif.

THE Photo Mill. Immediate service. Eight exposure roll developed and one print each good negative 30c; two, 40c; one jumbo each 35c; two 65c. Write for complete prices and mailers. The Photo Mill, Dept. K, 1511 Hennepin, Minneapolis, Minn.

BIRTHDAY? Hand-colored 5 x 7 en-largement from negative or photograph \$1.00. State colors. Snapshot Photo Service, 311 Citizens, Aberdeen, South Dakota.

PHOTOS Copied, 20 wallet-size deluxe prints \$1.00. Original picture returned. Send any size photo or negative. Federal Wallet-Size Photo Co., Dept. PM-4, P.O. Box 2448, Kansas City 6, Mo. (No c.o.d.'s please.)

ROLL Developed and 16 prints 40c. Free mailers. Fast service. Mayfair Photos, Box 617-K, Toledo 1, Ohio.

BEAUTIFUL Enlargement from each picture on roll, 8 exposure 35c; 12 exposure 45c. Cut Rate Photos, Dept. B-4, Janesville, Wis.

GUARANTEED Quality. Fast service. Eight jumbos in beautiful super pak plastic ring binder albums only 35c. Send for free mailers and particulars of our complete photo finishing service. Grand Fotos, G.P.O. Box 1410, New York 1, N. Y.

TOP Quality. Fast service. 8 jumbos 35c in beautiful super pak album. 16 contacts 40c. Reprints—Jumbos 4c; contacts 3c. Satisfaction guaranteed. Write for free mailers and circulars. Fast-X-Photo, Box A, Jersey City, N. J.

6 OR 8 Picture roll 35c, 12 or 16 pic-ture roll 55c. Each roll developed and printed in handy album pack. Send coin with roll. No c.o.d.'s. Mailing containers sent free. Deluxe Film Service, Box 1268-A, Shreveport, Louisiana.

ENLARGEMENTS! Eight 5 x 7's or five 8 x 10's. \$1.00. Wilart Enlargers, Box 967, Little Rock, Ark.

8 JUMBO Prints in album 30c; 12 exp. 45c; 20 exp. 85c; 36 exp. \$1.25. Free mailer. Mel's Photo, Box 106F, Brooklyn 20, N. Y.

JUMBO Prints, 8 exposure roll 30; 12 exposure 45c; 16 exposure 55c; reprints jumbo 4c. Guaranteed quality since 1915. Mail order Photo Service, Box 297, Watertown, Wisconsin.

12 JUMBOS From any size roll developed 25c with this ad only. S. Skrudland, Lake Geneva, Wis.

MOTION PICTURES AND SOUND EQUIPMENT

EARN Up to \$15.00 daily with your movie projector! Metcalf, 10906 Glenroy, Chicago 43.

8MM-16MM sophisticated film features. Frank Trigili, 804-A Eighth Avenue, New York 19, N. Y.

NOW! H. bomb movie release. 8 mm, 16 mm. Kodachrome. Ideal Service, 4644-H Geary, San Francisco 18, California.

2 x 2 COLOR Slides on San Francisco's highlights, 8 different shots \$1.50, sample 35c. Ideal Service Supply, Dept. S, 4644 Geary Blvd., San Francisco 18, California.

FREE! Blackhawk's fall sale catalog new and used 16mm., 8mm. films, used 16mm. sound projectors, new 3"x3" color slides. Blackhawk Films, 1000 Eastin, Davenport, Iowa.

INTERESTING 16MM sound movies. Rare combat films, hundreds hard to find collectors subjects. Low bargain prices. Free list. Gaines, Box 114-PM, Skokie, Ill.

RENT 16MM. sound feature pictures—\$3.95, three days, including delivery, return postage. 25-minute short subject programs, \$2.49. Big catalog free. Eastin Pictures, 106 Eastin Bldg., Davenport, Iowa.

WILD Animal and bird films. Beautiful color and b. and w. 2" x 2" slides and 8mm or 16mm movies. Write for free literature. Wild Life Films, 5151AK Strohm Ave., North Hollywood, Calif.

TAPE Recorders, tapes, accessories. Unusual values. Dressner, Box 66M, Peter Stuyvesant Station, New York City 9.

5,000 8-16MM. Silent-sound films. International, 2120 Strauss, Brooklyn 12.

MOVIE Camera film: 8mm. roll \$1.50, 16mm. 100' \$3.00. Free processing. Better Films, 742 New Lots, Brooklyn, N. Y.

GUARANTEED Fresh 8mm. roll, magazine; 16mm. roll, magazine movie films. Color, b&w. Free catalog. ESO-R, 47th Holly, Kansas City 2, Missouri.

RECORDERS, Tapes, equipment. Lowest quotations. Boynton Studio, 10 Pennsylvania, Tuckahoe, N. Y.

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SWISS Music movements assorted tunes \$1.70. Helax, 218 West 72nd Street, New York City.

AMATEUR Songwriters! Top notch Broadway staff offers help and suggestions for improving your song or lyric. Send \$1.00 with each manuscript or recording. Amateur Songwriters Workshop, P.O. Box 359A, Times Sq. Station, New York 36, New York.

SWISS Musical movements. Finest. \$2.50. Spielman, 131 West 42nd, New York 36.

SONGPOEMS Wanted. Collaborate with recognized songwriter. Send poems. La Motta Songs, 14 Bogardus Place, New York 34, New York.

SONGS Or song poems needed for commercial recording. Quick action. Celebrated expert offers you free copy of "Secrets of Song Success." Honest deal designed to benefit all concerned. Mail songs or poems now. Rexright Music Co., Dept. A, 5617 Hollywood Blvd., Hollywood 28, Calif.

SONGWRITERS: Large recording company may record your song. National sales and promotion if selected. No charge for melodies. Send song material to Music Makers, Dept. E-2, Box 2507, Hollywood, California.

SONGWRITERS! Outstanding offer. Ray Hibbler, C-3, 6808 Oleander, Chicago 31, Illinois.

WANTED! Poems for musical settings. Send poems now! Songwriting Service, 2950 Division, Chicago 22.

WRITE Songs for pay! My new easy method reveals professional secrets of profitable songwriting. Free information. Meadowlark Music School, 300 Sumner Road, Colorado Springs, Colorado.

AFFILIATED Songwriters. Mutual cooperation. Collaboration. Many benefits. Publishing, Recording, \$2.00 year. Web, 133 W. 48, New York 36.

1954 ACCORDIONS—Wholesale. Free catalog. American Accordion Center, PM-8, 5329 Belmont, Chicago.

WANTED! Poems for musical settings. Write Songwriters' Service, Clifton, N. J.

ACCORDIONS, Wholesale to everyone. Save up to 60%. All national known brands. Free catalogue. Del Principe, 29 South Cicero, Chicago 44.

SONGPOEMS Wanted. Mail to: Tin Pan Alley, Inc., 1650 Broadway, New York 19, N. Y.

FREE Record of your song. Your words, my melody. Free information. Johnny Mack's Melody Mart, 1094 West 39th Street, Dept. A, Los Angeles 37.

SONGWRITERS! Protect your ideas! Hold all songs, poems! Write for safe correct procedure first! Song Service, Dept. P, 333 W. 56th St., New York 19, N. Y.

POPULAR Songs. How to write and sell them. Write for free booklet Successful Songwriting. Gateway Songs, Box 2470, Hollywood 28, Calif.

SONGWRITERS! Send poems, songs. Music Service, 243 West 72nd St., PM, New York 23.

WRITE Songs. Big money and reputation. Write for information. J. Gordon Pub. Co., 4700 South California Avenue, Chicago.

POEMS Wanted for musical setting. Send poems. Free examination. Five Star Music Masters, 630 Beacon Bldg., Boston, Mass.

POEMS Wanted for musical setting. Send poems. Free examination. Crown Music Company, 1476 Broadway, New York City 36.

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BUILD 15 Radios at home—Only \$19.95 complete. Learn radio construction, theory, trouble-shooting, code, F.C.C. regulations. Complete radio course includes all parts, components, instruction books, etc. Free radio tester and soldering iron. You keep everything. No experience required. Money-back guarantee. Order direct or send for descriptive literature. Valuable radio and TV guide upon request, free of charge, no obligation. Progressive Edu-Kits Inc., 497 Union Ave., Dept. PM22, Brooklyn 11, N. Y.

FREE 308 Page 1955 television-radio-electronics catalog! World's largest stocks, lowest prices. Complete supplies for builders, experimenters, amateurs, servicemen. Latest builders' kits, TV, Hi-Fi, phonos, records, P.A. Thousands of parts, tubes, test instruments, books, diagrams. Top quality money-saving values. Get your copy now! Allied Radio Corp., 100 N. Western Ave., Dept. 34-K-4, Chicago 80, Ill.

REPAIR Your own TV or radio. Send make, model number, \$2.00. Limited offer. LJ Associates, 742 Snyder Ave., Philadelphia, Penna.

RADIO Tubes, all types. Guaranteed, also test kits, vacuum tube voltmeter. \$27.28. H. V. probe kit \$7.33. Ideal Service, 4644 Geary Blvd., San Francisco 18, Calif.

REPAIR Your own TV. Instructions compiled exclusively for your set. Simple as replacing light bulb. Send set name, chassis, model number, \$1.95. LS Engineering, Box 4113-J, North Hollywood, California.

TV Indoor antenna. Sensation. Dealers wanted. Send \$1 for sample. Dynalec, Box 2502, Denver.

INSTRUCTIONS, How to repair radios \$1.00. Slate's Radio Service, Corsicana, Texas.

F.C.C. Operator license quickly. Dept.-6, 6064 Hollywood Blvd., Hollywood 28, Calif.

FREE List. Builder's pictorial construction plans. Alena, 286 East Broadway, New York 2.

TELEVISION Antennas for pennies, from television lead wire. Popular "sneak antenna." Instructions \$1.00. Leonard, 729 East 10 Street, Brooklyn, N. Y.

FACTORY Authorized servicing diagrams and data for your TV receiver! Any make, any model, any year from 1946! 48-hour service! Just tell us the make and model! Only 70c for all the facts! Electronics Research Publishing Co., 480 Canal Street, New York 13.

24 PAGE Plans "18 Long Distance Crystal Sets" 25c, including "Radiobuilder," catalog, Laboratories, 328-C Fuller, Redwood City, California.

RADIO Diagrams \$1.00, television \$2.00. Give make, model. Diagram Service, 672-PM, Hartford 1, Conn.

TELEVISION Picture tube rejuvenator. Fits all makes picture tubes. Completely automatic. Easily installed. No tools needed. A.C. parallel circuits. Refund guaranteed. Special \$3.00 postpaid. Cash or money order. Stanley Distributors, 152 Franklin St., Elizabeth, N. J.

BUILD Your own top quality TV set. We supply complete equipment, tools, instructions as part of America's finest home-study TV course. Be a high-paid TV technician. Install, repair, service all makes of sets. Many excellent jobs now open. Or start your own business. Get full facts free. Write: Commercial Trades Institute, Dept. CT2-10, 1400 Greenleaf Ave., Chicago 26, Illinois.

TERRIFIC! Attach Zingo 3 color television screen to your set. Enjoy color now. Send \$1 for size 10", 12", or 14"; \$1.25, 17"; \$1.50, 20"; \$2, 21"; \$2.50, 24"; \$3, 27". Satisfaction guaranteed. Inquiries from dealers also welcomed. Zingo Products, Johnstown 77, New York.

MAKE Simple, tubeless, batteryless, distance-getting radio. Genuine Melomite crystal, detector, illustrated instructions. 50c postpaid. Allen, 427-PM5, Clinton, Mo.

CRYSTAL Radio experimenters. Write Leslie Hulet, R4, Lakewood, New Jersey.

RADIO One tube kit. Parts, tube, phone, batteries, instructions, nothing else to buy, \$7.95. Less phone and batteries, \$4.95. Crystal radio kit \$1.50; preassembled \$1.75. Crystal radio plans and germanium diode, \$1.00. Plans and Clearco detector, 50c. Free catalogue. Clearco Crystal Company, Box 1857, Milwaukee, Wis.

WHOLESALE Parts flyer free. Wholesale Electronics, 673 Elton Avenue, New York City 51.

BUSINESS OPPORTUNITIES

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NEW Company would like to start you earning money by raising mushrooms. Easy to do it anywhere, cellar, shed, garage. Send to: The Mushroom Lab, P.O. Box 226, Lawrence, Mass.

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TYPE For pay, 25 ways. Write McAllister, 1513-PM-10 Charlotte, New York 60, N. Y.

BUILD Amazing home business supplying multi vitamin-mineral tablets. Whirlwind seller. Great repeater. Profits tremendous. Everything furnished. Free facts. Vitine Company, 208-CK Pacific Building, Miami 32, Florida.

START Home mailorder. Details. Gimbert, 1454 West Washington, Petersburg, Virginia.

\$26,500 SALES in two weeks! Amazing radio-mail order method. Free details. Broadcast Service, 1412-OP Great Northern Building, Chicago 4, Illinois.

MAKE Perfumes, other profitable products. Carelabs, 1914-PM Chouteau, St. Louis 3, Missouri.

WHOLESALE! Hundreds nationally advertised appliances, cameras, toys, kitchenware. Country's lowest prices. Large catalog 10c. Schibani, 1402 North 21st, Birmingham 4, Alabama.

MAKE Rhinestone jewelry. Send \$1.50 for pin and earring kit. Retail value \$3.50. Free catalog. Ebert, Box P183, East Orange, New Jersey.

START Own business, local mail order, folders describes 137 money-making plans free. Ferguson Publishing Company, 324 W. Maple Road, Box 102, Indianapolis 8, Indiana.

OPERATE "Escalator" mailorder system, selling our products or any products. Write: Selbyco, Decatur 161, Illinois.

FOOD Mailorder business. Home operated. Everything supplied. Successful proven method. Free sample, details. Frasar Foods, Desert Springs 11, Calif.

START In mailorder without capital for merchandise and advertising. Information free. Morris Colson, 406 E. Fox St., South Bend 14, Ind.

MEXICO Imports—Mail order business, sparetime. Romantic, profitable. Dime brings particulars. Frontier Imports, 2909 Pershing, El Paso, Texas.

OPERATE Profitable mail order business. Splendid opportunity. For details write, S.M.C. Mailing system, P.O. Box 94, Lamoni, Iowa.

START Own business. Booklet describing "301 Business Plans" free. Shalack, Box 869 P.M., Grand Central Station, New York 17, N. Y.

MAIL Letters from your home—Get \$5-\$10 orders in every mail. Keep half. A. Dadson, 8523 Baker, Houston 17, Texas.

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AN Important message for you! Is extra money important to you? Would you invest 4 days a week for \$200? Many other smart people are cashing in big in this lucrative repeat business. Captain Payne's booklet reveals hitherto little known secrets of making big money from the products of the sea. Business flourishes in depression, booms in good times, you can't miss. Payne's plan good in both coastal and inland states. Start your own business. Be your own boss. Act now. Send \$2 for booklet to Capt. Fred Payne, P.O. Box 73, Medford, N. Y.

OPERATE Profitable mail order business. Selling cartooning courses. Write Templeton, 1210 Riverview Court, Columbus 1, Ohio.

SHINE Cars without "polish." New invention. Lightning seller. Cars gleam like mirror. Samples sent on trial. Kristee 105, Akron, Ohio.

START A buying service, buy wholesale thousands nationally advertised products. Make big profits selling at sizable discounts. Postcard brings details. American Buyers, 627-R Linden, Buffalo, N. Y.

FREE Kit puts you in business selling world's famous French-type perfumes. Reproductions costly fragrances. Individually gold boxed \$1 sellers. Costs you \$3 dozen. You make \$9. Mammoth treasure royal box, 3 thrilling fragrances in one fabulous gold box. \$3 sellers. Costs you \$6 dozen. You make \$30. No experience needed. Pull or part time. "Husk" O'Hare, 5732 North Kenmore, Chicago 40, Illinois.

BE Your own boss, 301 plans, free details. Sam Smith, 525 Auditorium, Daytona Beach, Florida.

START Your own business on credit. Your own boss. 1661 of our dealers sold \$5,000 to \$28,500 in 1953. We supply stocks, equipment on credit. 200 home necessities. Sales experience unnecessary. Pleasant profitable business backed by world-wide industry. Write Rawleigh's, Dept. J-U-P.M., Freeport, Ill.

DO Your own printing. Save money. Make money. Print stationery, cards, envelopes, profitable advertising work, etc., with world's lowest priced professional printing press! Everyone needs printing—now you can do it easily, and make money. We show you how. Complete outfit only \$27.95. Send \$5c for illustrated manual "How To Print" and free details. Wellington Organization, Dept. 10-W, 953 West Belmont Avenue, Chicago 14, Illinois.

IMPORT-Export: Opportunity, profitable, world-wide, mail-order business from home, without capital; or travel abroad. Established world trader ships instructions for no-risk examination. Experience unnecessary. Free details. Mellinger A70A, Los Angeles 24.

TRADE Magazines. See late copies through our easy to get acquainted service. Choose from 4,387, covering all fields. Current list free. Commercial Engraving Publishing Company, 34C North Ritter, Indianapolis 19, Indiana.

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NEWEST Spare, full-time home business. \$5 to \$10 hour possible. Paint with suede—The finish with touch and eye appeal. Beautify auto dashboards, signs, radios, toys, figurines, lamps—1001 others. Complete, step-by-step instructions sent for no-risk examination. Free details. Coast, 1004-MZ So. Los Angeles St., Los Angeles 15.

COMMISSION Circulars—Offering real merchandise. Send for samples and details. Products, Box 23, Boston 17, Mass.

OWN Your own profitable buying service! Buy wholesale 10,000 nationally advertised appliances, homewares, jewelry, sporting goods, toys. Save yourself 66 2/3%! Unlimited profits selling others at discount! Free details. National Buyers Service, Box 426EA, Oakland, California.

MEN Wanted—Build luggage and cases at home. We sell your products, supply complete instructions, materials, everything. No special equipment needed. Free details. Cascraft, 805-G10 Sunset, Los Angeles 12, Calif.

COST Of things going up faster than your income? You can make more full or part time as a Rawleigh dealer. Write for full particulars. Rawleigh's, Dept. J-RR-P.M., Freeport, Ill.

BUY Wholesale! Save up to 80% on nationally advertised merchandise. Free information on any product. Catalog \$1.00, refundable. Nina Skidmore, 121 Pine, Elizabethton, Tenn.

FREE! "301 Profitable Small Businesses!" Amazing shoestring plans! Work home! Start sparetime! Deumant Surveys, Kenmore 23-R, N. Y.

GET Money by mail. Details free. Succeed, P. O. Box 962, Portland 7, Oregon.

POPCORN And potato chip equipment. Eakins, Box 933-A, Springfield, Ohio.

MERCHANTS Motorized displays easily made your shop. Write: Display Motors, 139 E. Second, Reno, Nevada.

MAKE Perfumes, other products. Sell mailorder. Formula catalogue free. International, 6347 Parnell PM-10, Chicago 21, Illinois.

MAKE Extra money between now and Christmas. Sell subscriptions to all popular magazines. Liberal commissions. For supplies write DeSales Magazine Service, 60 East 42nd St., New York 17, N. Y.

AUTO Wrecking and used parts selling can bring you surprising profits. Start anywhere as a side line with very small investment. 52 page booklet tells how to locate, disassemble and sell. The entire business planned. Plain and practical. \$2.00. Harry F. Tyler, P.O. Box 22, Severna Park 7, Maryland.

BECOME A game warden, or join forestry, park, lookout, wildlife conservation services. Enjoy outdoor work, good pay, real security. Complete information free! Write Home-Study Institute, 3156OR West Eighth, Los Angeles 5, California.

WOOD Toy wheels. \$1.00 brings 8 finely machined samples. E. L. Overstreet, Route 3, Box 243-A, Lufkin, Texas.

SELL Popular Mechanics and all other magazine subscriptions. Free catalog, supplies. Subscription Service Company, Dept. A, P.O. Box 2070, Birmingham, Alabama.

ADVERTISING Book matches—Cash in on big demand; sell union label matches. Cuts for all businesses and political parties. Free powerhouse selling kit, low prices, protection guaranteed on repeat orders. Cash commissions. Superior Match Co., Dept. MX-1054, 7530 Greenwood, Chicago.

LEARN Sewing machine repair, electrify, trade, sell. How to make big money at home sparetime. New zigzag machines, parts, etc., wholesale. Free details. Taylor Service, Hamilton PM-10, Ohio.

BIG Profits owning your own wholesale merchandising business. No investment! America's greatest wholesale appliance, homewares, jewelry, sporting goods catalog in color with your own name. We drop ship. Free brochure. General Wholesalers, Box 1195EG, Chicago; Box 3038EG, San Francisco.

WHOLESALE Catalog! 30-80% discounts! Nationally advertised appliances, gifts, watches, cameras, tools, etc. Start your own fully self-operating mail order business without capital! No experience necessary. Wholesale starting kits furnished. Outline of unique automatic sales plan included. Consolidated Distributors, Division 119, 21 Lafayette, Paterson 15, New Jersey.

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PART Time or full time. Your own business, selling name brands. No inventory required. Manhattan-W, 225 W. 57 St., New York City.

\$1,000 MONTHLY Possible in collection agency business. Free details. Write Cole Associates, Syracuse 2, N. Y.

\$10 DAY Sparetime mailorder. Costs nothing to try. White, 2615 Willo, Costa Mesa 4, Calif.

WANTED! Home producers, by manufacturers in our clearing house service. Become subcontractor, casting plastic products for these companies. Thousands of easy-to-make items required for consumer-industrial use. Cash in at home, without previous experience. Plastic Service Associates, Dept. 10-PM, East Boston 28, Mass.

GROW Orchids at home—Profitable, fascinating. Year 'round, Maine to California. No greenhouse. Gorgeous cattleyas, cymbidiums, etc. Successful home grower shows you how. Full details free. Flowerland, 4622-PG Wilshire, Los Angeles 5.

START Your own rubber stamp business. Hundreds of customers in your own neighborhood. It's easy, we show you how. Turn spare time into money. Write for free details. Wellington Organization, Dept. 10-P, 953 West Belmont, Chicago 14, Ill.

MAKE Money by mail. 12 big issues 25c. Luft's Advertiser, Hermansville, Michigan.

BRONZE Baby shoe mountings, beautiful designs, all-metal ashtrays, bookends, picture frames, \$2.25 each. Free literature. Bronzecraft Mountings, Greenville Station, Jersey City, New Jersey.

ARE You starting a business? Do you need help? Avoid costly pitfalls. Write Marchner Business Service, 2033 East Main St., Rochester 9, N. Y.

CHRISTMAS Trees bring big profits. Complete "know-how" 25c. Timberline, Box 332, Glens Falls, New York.

DOLLARS In personalized baby record books. Sell by mail. Eleven thousand new prospects daily. Use same literature we do. No-Co-Ro, Oakland 6, California.

MAKE All purpose proven best stucco and masonry paint, big profits. Free information. Larstane, 3419-9 East, Salt Lake City 6, Utah.

FOR Big money, learn sewing machine repair. Guaranteed plans, assures success. Write Purdy's, Box 207, Weatherford, Texas.

LEARN Real estate business for highly profitable lifetime career. Study at home. Newer, quicker, better method. Diploma awarded. Surprisingly low cost. Free literature. Seavy Realty Institute, 1750-B Colorado Blvd., Los Angeles 41, California.

GET Pair of Chinchillas at half price. Also 1000% profit plan. H. N. Jennings, 211 Roby Ave., East Syracuse, N. Y.

EXTRA Money!—Typing. 9-plans one dollar. Home Enterprises, 817-B Park S.W., Canton, Ohio.

START Your own business! Small investment. Terrific profits selling vitamins. National Health, 83 Barclay St., New York 7.

FREE Folio "45,000 Unlimited Vacations Plan." No canvassing, mailorder, merchandise, equipment. Unknown. Works itself—home! Haylings, Carlsbad, Calif.

FRANCHISES Make amazing profits! Exclusive distributorships, dealerships, agencies available. Fascinating, nationwide opportunities. Information rushed. National Franchise Reports, 920 North Michigan Avenue, Chicago 11, Illinois.

\$500,000.00 LIFETIME Earnings? Digitized administrative profession. Immediate income—Easy! Inspirational booklet: Auditax, 34651AA, Los Angeles 34.

YOUR Own profitable home mail order business. Small investment starts you. Free details. C. D. Crider, P.O. Box 156, Delhi, La.

HOME Business pays amazing profits. \$40.00 daily possible, sharpening circular saws. No experience needed. Jobs in your own neighborhood. Free book tells how. Belsaw, 34A Field Bldg., Kansas City 11, Mo.

MAKE Attractive building plastic, easily. Build and repair better for half. Bays Laboratories, Oklahoma City 9.

MONEY For your spare time. Agents needed for leading national magazines. Liberal commissions. Write ATSA, 3132 M St. N.W., Washington 7, D. C.

MONEY, Typing—sewing! Details free. Edwards, 3915-PM, 12th, Des Moines 13, Iowa.

EARN \$2.00 Hour! I do, making sandals. Youngs, 1308-PM, South First, Arcadia, California.

FREE Details. Profitable home mail-order business. Everything supplied. Holly's, Box 439, Jacksonville, N. C.

FREE Details name brands wholesale. Triple J Industries, 132 Berkshire, Bridgeport 8, Conn.

MAIL Order. Details free. Lexington Mail Service, 5511 Monroe, Chicago 44.

BUY Wholesale 450,000 products. Literature free. Carter, Box 6011-L, Chicago 80.

OWN A profitable home business. Free brochure on practical plans. Lorimer's, Box 2429, Greensboro, N. C.

FREE Literature, cedar, walnut magazine racks, unpainted figurines, Boyd's, Galena, Missouri.

TIN-Cans. Turn them into cash. Nine methods. Instructions 50c. Charles Company, 12-DCF, Norwood, Ohio.

OWN Operate route wishing wells. Place these new \$8.50 skill games on counters in cafes, luncheonettes, clubs, etc. Collect coins weekly. Write, Legalsharr, Box 929, Long Beach 1, California.

START Venetian blind laundry—machine patented. Inventor, world's largest manufacturer explains how. Free booklet. Jet Company, 522 N. Rural, Indianapolis 1, Indiana.

SELL! Buy! Trade! Anything. In "Trading Post Magazine." Sample 20c. Details free. Thorne's, 525 Dewey, Jackson 15, Michigan.

\$5,000.00 WORKING Ninety days! Become tax consultant. Auditax, 34651CA, Los Angeles 34.

MAKE Flexible molds. Cast figurines, plaques. Free sample. Tooker, 630-R Chestnut, Hamilton, Ohio.

AMAZING Home business plans. Write. Falcon House, Winnebago 2, Illinois.

MAKE Perfume, 39 formulas \$1.00. Billows, 110-65 37 Ave., Corona 68, N. Y.

FORTUNES Made raising crickets and fishworms. Guaranteed raising and marketing instructions, \$1.00. Carter Farms, Plains, Georgia.

NEW-Different home business opportunity! Address-mail literature featuring real merchandise. Everything furnished. Mills, 1752-A, Garden Ave., Lorain, Ohio.

GET \$10.00 Orders by mail! 100% profit! Everything furnished. Terrill, Bogard, Mo.

EXPORT Business easy made! Substantial income from home. No merchandise buying. Full setup service includes everything. Hermes Exports, 152 West 42, New York 18.

METALIZE Baby shoes, jewelry, gifts. Bronze, gold, silver. Free bulletin. Kiktavi, 7217-PY South Broadway, Los Angeles 3.

HAVE Home business mailing postcards offering real merchandise. Big earnings. Write: Mednis, 10 Port Norfolk, Boston 22, Massachusetts.

NATURAL Molding rubber, extra thick. Free sample. Flock, W. Wooley, 115-A Donald, Peoria, Ill.

LIQUID Rubber, make flexible molds. Free sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

MAKE Rubber stamps, repair dolls; learn silk screen printing. Catalogue (60 ideas) free. Universal, Box 1076-A, Peoria, Ill.

MAILORDER—Operate profitable home business using free advertising method. Revealing information free. Seidel, 7078-HF Hollywood, Los Angeles 28.

\$900 A Year sparetime sharpening saws at home. No selling. Hardware stores get saws on commission basis. Free booklet tells how. Victor Foley Company, Columbia Heights, Minnesota.

OVER 700% Profit making finished photos in 2 minutes on the spot in daylight without darkroom. No experience needed. Simple directions teach you quickly. Write P D Q Camera Co., 1161 N. Cleveland Ave., Dept. FM, Chicago 10, Illinois.

ELECTROPLATE Auto parts, novelties, mirrors, baby shoes. Easy, inexpensive home processes. Free booklet. Tyco Metals, Box 13231-MM, Houston 19, Texas.

BOOKKEEPERS. Keep books, small firms spare time. Manual latest technique by C.P.A., \$3.00. Modern Business, Box 466, Youngstown 1, Ohio.

MAKE Money at home—Mail cards, circulars feature real merchandise. Everything furnished. Big earnings. Philip's, Box 3-P, Boston 22, Mass.

RECAST Old batteries into new. Latest achievements. Battery Laboratories, Minneapolis.

START Venetian blind laundry. Profitable lifetime business. New machine. Free booklet. F. C. Co., 442 N. Seneca, Wichita 12, Kansas.

WHOLESALE Of sensational nationally advertised appliances, silverware, watches, cameras, etc. Start your own business. Full details. Send 50c for catalogue. International Sales Co., 175 Fifth Ave., New York 10, N. Y.

HOW And where to obtain capital. Particulars free. Star Service, Wapakoneta, Ohio.

TO \$40.00 Weekly. Sparetime, home operated mailorder business. Successful beginner's plan. Everything supplied. Lynn, 10420-M National, Los Angeles 34, Calif.

COPUBLISH Mail Sale Advertiser, leading mail order paper. Details, latest copy, dime. Vanroy Shirk, Lebanon, Penna.

EARN Money at home! Homemaker Magazine tells how. Sample, 25c. Sizemore, Box 7, 4917 Kostner, Chicago 36.

SCHEMER Magazine, Canfield 1, Ohio, monthly mailorder ideas, plans. Year \$1.00. Sample 20c.

PLASTERCRAFT Molds, liquid rubber, plasters, blocks, candle supplies. Catalog and manual free. Blue Rapids Supply, Blue Rapids, Kansas.

BUY It wholesale! Manufacturers, distributors offer \$50,000 items. Literature free. Olsen, 1231-A East Third St., Duluth 5, Minn.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay \$3.50 lb. We paid Babbit \$4,165.00 in few weeks. Free book. Washington Mushroom Ind., Dept. 172, 2954 Admiral Way, Seattle, Washington.

\$46 FROM Square foot plywood; jig saw necessary. Write: Woodarts, Bridgewater, Mass.

\$25 WEEKLY Working two hours daily at home. Lycke, Box 3471-A, Cleveland 12, Ohio.

BREED Rare tropical fish at home. Earn big money! Learn secrets! Help fill huge demand. Amazing opportunity! Free plan. Tropicals, 1008-P Los Angeles St., Los Angeles 15.

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RESILVERING Mirrors, formula 50c; two-way lookout mirrors, (No one sees you), 50c; coppered mirrors, 50c. All \$1.00. Nelko-Mir, Box 3462-J, Chicago 64.

LIVING Miniature ("Ming") trees only 10 to 20 inches tall. Grow at home. Big profits! Spare time opportunity. Fascinating! Amazing! Write for free seed and plan. National Nursery, Dept. PC, Inglewood 4, California.

MAKE Money spare or full time, casting metal toys and novelties. Big wholesale and chain store demand for autos, soldiers, ashtrays, banks, etc., keeps manufacturers busy. Production moulds furnished for up to 100 and more castings per hour. No experience or special place necessary. Write for information and illustrations of patterns needed. Metal Cast Products Co., Dept. A, 1696 Boston Road, New York 60, N. Y.

OPERATE Profitable mail order business. Write Walter Service, 4159-A East 112th, Cleveland 5, Ohio.

GOOD Paying business silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late method. No tanks or shop required. Outfit furnished. Free booklet. Gunmetal Co., Ave. H, Decatur, Illinois.

MINK Raising information free. Complete. Lake Superior Mink Farm, Superior, EEL, Wisconsin.

COLORGLAZED Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries Company, Grand Rapids, Minnesota.

FREE Book "505 Odd, Successful Businesses." Work home. Expect something odd! Pacific, Oceanside, Calif.

FIX Typewriters. Free booklet describes our modern, inexpensive home-study course. Factory methods taught. Write Typewriter, Building 1, Tarentum, Penna.

MONEY In new greaseless doughnuts. Start in kitchen. No smoke. Sell stores. Free recipes. M. Ray Company, 3605 South 15th Ave., Minneapolis 7, Minn.

BRONZED Baby shoe supplies, instructions, mountings. Metal bookends, \$1.50 pair. Free catalog. National Bronze Supply, Box 56, Los Angeles 32, Calif.

MAILORDER Home business! Details stamp. Shirley, 20-Raspeburg, Baltimore 6, Maryland.

MILLION Articles wholesale. Supply source directory 10c. Idealer, Park Ridge, Illinois.

SELL Books, merchandise by mail. Good profits. We furnish circulars, names—Ship your orders. National, Box 88, Dorchester, 220, Mass.

MONEYMAKING Mailorder business plan. Free! Write, George Lenhoff, Lincoln 8, Nebraska.

BOOKKEEPERS. Increase earnings operating sensational bookkeeping service. Kern, 4942 Vineland, North Hollywood, California.

MAKE Money at home as renewal headquarters for all magazines. Big Christmas sales profits now. Liberal commissions. Supplies furnished. Write for free catalog. McGregor Magazine Agency, Dept. 5005, Mount Morris, Ill.

VENDING Machines—No selling. Operate a route of coin machines and earn amazing profits. 32-page catalog free. Parkway Machine Corporation, Dept. 72, 715 Ensor St., Baltimore 2, Md.

SELL By mail! "How to Build Your Own Mail Order Business" tells how. Satisfaction guaranteed. Only 25c. Fred La Roche, Merritt Island 3, Florida.

ANSWER Advertisements easier! 500 name-address labels \$1.00 postpaid. Miles Crafts, 3220-P Fish Avenue, New York 69.

LOWER Priced metal baby shoe mountings. Posters, 1520 Ardmore, Chicago 26.

BOOKLET "Your Business at Home," \$1.00. Home Industries Association, Dept. PS, 1727 K Street N. W., Washington 6, D. C.

NEW Exceptionally profitable plans, ideas for home operated mail business. Rush name. Miller, 1772-P Carlyon Road, East Cleveland 12, Ohio.

OPERATE Your own mail order business! Start right! Avoid costly mistakes! "Mail Order Business Manual" shows you how! Price \$1.00. Bud E. Hine, Box 93, Battle Creek, Michigan.

BRONZE Baby shoes. Instructions, equipment and mountings for genuine electroplated process. Free catalog. Hollywood Bronze Supply, Dept. B-3, 1634 East First Street, Los Angeles 33, Calif.

LEARN Exterminating formulas, secrets, charges. Manual tells all. \$1.00 postpaid. Knox, 1208 Walnut, Philadelphia 7.

RAISE Earthworms! Terrific! Get essential information plus story, "An Earthworm Turned His Life." Send dime. Earthmaster System, 8H, El Monte, Calif. Hurry!

EARN \$2.50 To \$6.00 per hour plating auto parts, baby shoes, etc. Part or full time. Free information, trade secrets. Plater B. Hyde, 327 West 120th Street, Los Angeles 61, California.

FLEXIBLE Rubber molds for plaster and Marble figurines. Sample and large illustrated catalogue 25c, refunded on first order. K-C Novelties, Dept. 74, Easthampton, Mass.

UNUSUAL Mail order ideas, sources. Details free. Fax, Box 241, Brownwood, Texas.

MAKE Big money at home! Invisible re-weaving pays up to \$10.00 profit in an hour. Make tears, holes disappear from fabrics. Constant demand from laundries, cleaners, homes, brings steady earnings. Details free. Fabricon, Dept. AE, 8342 S. Prairie, Chicago 19, Illinois.

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I can teach you how to direct money-raising campaigns for churches, hospitals, institutions. Earned \$3065 in six weeks on my first campaign. Started spare time on less than \$50. Thirty years experience in 15 lessons. Low cost. Unlimited field. William Arbogast, 229 East Mason Avenue, Alexandria, Virginia.

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GIANT Wholesale catalog, nationally advertised merchandise \$1.00, refundable. Speedway, 2320 N. Raynor, Joliet, Ill.

NEW 7"x11" Ultra-blue signs. 7c, retail 50c. Sample free! Lowy, 812 Broadway, Dept. 816, New York 3.

FREE! "301 Profitable Small Businesses!" Amazing shoestring plans! Work home! Start sparetime. Deumant Surveys, Kenmore 23-R, N. Y.

INCREASE Your income, turn your spare time into cash—Making quick-selling, highly profitable lamps and fiber glass shades. Every home a prospect for one or more. Hundreds already doing it, so can you. No experience needed. No special tools required. Gearon's big, new 72 page 1954 illustrated Catalog No. 8 will show you how, quickly. One special 8-page section shows 6 beautiful lamps in kit form, ready for you to assemble. Another 12-page section shows you how to make stunning, ultra-modern fiber glass shades. Page after page filled with wide variety of other attractive shades, shade frames, figurines, and lamp bases. Also oil lamp converters, boring compound, and all kinds of cords, sockets, pipes, harps, finials, bases, and hundreds of other parts. Everything you need. And you can buy everything wholesale, sell at retail, make big profits, fast. Send only 25c right now for Gearon's big 1954 catalog and wholesale price list. Like hundreds of others, you'll be glad you did. Gearon Co., Dept. 503-B10, 27 S. Desplaines, Chicago 6, Ill.

LEARN Technical Metaphysics and insure your future. Easy, inexpensive correspondence course. Simplest method known. Diploma. Write: Premier College of Technical Metaphysics, 2532 McKenzie St., Vancouver, B. C., Canada.

EARN More money at home. Age no handicap. Easy. Hoffmann, 880 Glen, San Leandro, Calif.

START A buying service, buy wholesale thousands nationally advertised products. Make big profits selling at sizable discounts. Postcard brings details. American Buyers, 630-R, Linden, Buffalo, N. Y.

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EARN Money forwarding letters, clip-pings, etc. Box 211, Reading, Mass.

BUY Wholesale! Thousands nationally advertised items. Save—Make money! Free details. Durex, Box 672-PM, Chicago 90.

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free, no obligation. Simply address Cartoonists' Exchange, Dept. 910-CM, Pleasant Hill, Ohio.

BOOKKEEPERS! Forget debits, credits, double entry! Govt. investigators want records, not systems. More firms use our simple, inexpensive method than any other. Popular demand. Unlimited earnings. Age no barrier. Live anywhere. Amazing details free. Penna. Business Service, Box 923, York 3, Penna.

EARN \$50.00 Daily making mats, shoes and mud guards from old tires. S and S Patents Inc., 1307 North Clark St., Chicago 10, Ill.

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\$200 MONTHLY Possible raising earthworms! Backyard, garage, basement. Complete, illustrated booklet explains raising, feeding, packing, marketing. 25c post-paid! Oark Worm Farm-3, Willow Springs, Missouri.

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LEARN How to make money. Details free! Wrede, Atkinson, N. C.

MOLDS—Figurines. Wholesale circular 10c. Novelties, Box 45 R1, Fremont, Ohio.

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DOLLARS in your mail box daily. No stock investment. Particulars free. Gem, 44-B Atlantic, Pleasantville, New Jersey.

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BIG Profits in spare time! I'll send, on free trial, assortment full-size samples fine foods, household necessities to ambitious men—women who need money. Friends, neighbors buy eagerly. Send no money. Just write Blair, Dept. 31MT-2, Lynchburg, Va.

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HARNESS The sun in your own back yard for only a few dollars. You can charge admission for showing how the sun's power can melt metal and create free electricity. Complete plans \$1.00. Solar Power, P.O. Box 212, Streator, Ill.

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MAKE Extra money selling cast aluminum name plates. For full particulars write McConnell Bros., Springfield, Ill.

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KEY Making small investment—Big profits. Everything needed to start. Key machines. Complete setups from \$94.50. Send for free literature. Hugo Solomon & Son, 70 East Warren, Detroit 1, Michigan.

GENERAL Contest Bulletin. Issued monthly. Sample, 25c. 1609½ East 5th, Duluth, Minn.

NEW Baby items. Agents, salesmen, distributors. Natural for mail order. Write: Liebig Industries, Beaver Dam 5, Wis.

100% PROFIT! Mexican featherbird pictures. Hot sellers! Edmunds, 3009-P Weaver Ave., Baltimore 14, Md.

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SPARETIME Profits taking subscriptions, all magazines. Wholesale catalog free. Cassell Agency, Westfield 2, New Jersey.

\$0.000 ARTICLES Wholesale. Source directory, dime. Nelko, Box 3462-DR, Chicago 54.

READ Progressive Mailtrade, the magazine that tells how to make money by mail. Dime brings sample and special offer. Progressive Mailtrade, Box 357, Sheboygan, Wisconsin.

PUBLISH Your own magazine. Handsome 52 page format, well edited, illustrated. Cost low as \$1.00 month. Brings you prestige, profits. 25c brings sample, details. National, Ord. Nebr.

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FREE Literature describing moneymaking mailorder plans. Lewis Barlett, Richland, Georgia.

BUILD Sales by recruiting productive distributors selling direct or to retail outlets. Secure most concentrated circulation through classified columns of Salesman's Opportunity. Write for facts. Gilbert, Salesman's Opportunity, Room 1700, 28 East Jackson, Chicago 4.

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SELL—Buy Titania gems. More brilliant than diamonds. \$9.75 carat wholesale. Free catalogue. Diamondite, 1404-M Mitchell, Oakland 1, California.

OPERATE Profitable mail order business. Roblin Sales, 1001 Curtiss, Downers Grove, Ill.

NEED Money? Sell the sensational BM game. Sample and plan \$1.00. Deming Products Co., 841 Bennett St., Jackson, Michigan.

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SCHOOL Seniors—Sell classmates America's most beautiful graduation name cards. Largest selection. Highest commission. Outsell all others. Free sample kit. Printcraft, Dept. M, 1509 Maple Street, Scranton 5, Penna.

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GUARANTEED Formula. No acids. Cleans cesspools, septic tanks. Free particulars. Reylo, Box 666, Council Bluffs, Iowa.

LIFETIME Business! Manufacture extremely profitable products! Lists free! Thermolab, Peoria 4, Ill.

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PRODUCT Analysis, manufacturing formulas, processes developed. Moderate fees. Plastics, Box 1574, Boston 4, Mass.

MAKE Big profits manufacturing perfumes. Introductory manual \$1. Fragrance Research Foundation, 1513 Oxford Way, Oklahoma City 14, Oklahoma.

FREE Formula catalog. Anything analyzed \$35. Western Chemical, Salem, Ore.

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PLASTICS Home-craft course for men and women. Tells and shows how to make hundreds of fast selling plastics products. All plastics and materials for 23 projects included in course. No special tools needed. Course pays for itself. Write for free booklet. Interstate Training Service, Dept. D-3-K, Portland 13, Oregon.

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LAMINATORS Increase sales or if you are entering this field we can help you. Details free. National Association Plastic Laminators, 707 Market St., Knoxville, Tenn.

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FLEXIGLAS, Lucite. Square foot cost 1/16"—\$1.16, 1/8"—\$1.53, 3/16"—\$1.88, 1/4"—\$2.23, 3/8"—\$3.28, 1/2"—\$4.38. Colors add 10%. Send 10% for postage. Aristocrat Plastics, Inc., 55 Clarkson St., New York City.

CHEMISTRY

CHEMICALS, Supplies. Catalog. 20c. Laboratory Sales, Box 161-A, Brighton, Mass.

LABORATORY Pyrotechnics manual, interesting and thorough. Contains complete formulas, set-ups, instructions on spectacular chemical experiments, thermites, fulminates, acetylides, nitrogen iodides, explosive powders, etc. Easily modified. Still \$1.00 postpaid. Chemi-Tech Lab, 568DB Riley, Buffalo 8, New York.

AMAZING New book of science. Experiments, formulas and catalogue of laboratory supplies. Only 25c. National Scientific Co., Dept. PM-10, 2204 W. North Ave., Chicago 47, Ill.

GEIGER Counters, \$29.95 up. Free catalog. Atomic Laboratory, Box 343, Berkeley, California.

NEW Idea chemical and apparatus outfits for home experimenting. Photo-scales, microscopes, chemicals, biological and laboratory supplies in small quantities. Catalog 25c. Established 1931. John H. Winn, 124A West 23rd Street, New York, N. Y.

CHEMICALS And apparatus for industrial, analytical, and private laboratories. Catalog 25c. Dept. M-50, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology 20c. Tracey Laboratories, Evanston, Illinois.

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NATIONALLY Advertised merchandise. Rush 30 cents for illustrated catalog showing retail prices to Edward Clemens, 318 W. Bridge St., Morrisville, Penna.

NATIONALLY Advertised appliances, cookware, diamonds, typewriters, watches, etc. Wholesale catalog 50c. J. J. Davis Co., 30 E. Englewood Ave., Englewood, New Jersey.

WHOLESALE: Sell retail, tremendous profits. Nationally advertised products. Individual purchases. Catalog \$1.00. Day, Mount Morris, New York.

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SAVE 50-75% On household appliances. Free gift. Wholesale catalog. Nueblings-M. Sicklerville, N. J.

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EARLY Christmas shoppers? Wholesale catalog, bonus plan. Complete line nationally advertised merchandise. Pette Company, 1554-PM West 11 Street, Brooklyn 4, New York.

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MAKE 20%-50% Cash bonus on generous cash commissions. Take orders for lingerie, blouses, guaranteed hosiery, etc., with self-selling features. Free selling outfit. American Mills, Dept. 436, Indianapolis, Ind.

OWN Your own profitable wholesale merchandising business. No investment! Sell nationally advertised appliances, homewares, jewelry, sporting goods everybody buys. Your own name catalog in color! We drop ship. Free brochure. General Wholesalers, Box 1195EF, Chicago; Box 3058EF, San Francisco.

SELL New 3-dimensional "action" Christmas, birthday, get well cards. Make \$50, \$75, \$100 extra money. Profits to 120%, plus extra cash bonus. Write for feature assortments on approval, free samples personal Christmas cards, stationery, free color catalog, selling guide. New England Art Publishers, North Abington 1032B, Mass.

NEW Plastic mending tape. Just press on! Repairs clothing instantly. Lightning seller. Samples sent on trial. Kristee 62, Akron, Ohio.

SENSATIONAL New portable burglar alarm "The Night Watchman" for homes and all places of business. Combines instant automatic floodlighting with a terrific alarm. One instrument protects every point of entry simultaneously such as doors, windows, etc. Merely plugs into any convenient electrical outlet the same as a radio, floor lamp, etc. Deluxe in appearance. All electrical parts Underwriter Laboratories approved. Sells on sight. Convenient to handle. Weight twelve pounds. Sells for only \$89.50. You make \$20 on each instrument. Send for circular matter and information on exclusive territorial rights. Chicago Alarm Company, Manufacturers, 2252 W. 111th Place, Chicago 4, Illinois.

SPARE Time money plus new car as encouragement bonus. Amazing 60 gauge nylon 3 pairs guaranteed 3 months. Write Wilkint, 17410 Wash., Greenfield, Ohio.

AGENTS—Sell most space saving tie racks. Big easy seller, 150% profit. Three sizes. Details free. James Products, 1625-50th Ave., Cicero, Ill.

GOLD Letters, 25c. Frank Watkins, 1241 Overton Park, Memphis, Tennessee.

"FOG-STOP" windshield cloth. Instantly removes blurry mist, frost, sleet, snow. Stops windshield fogging. Samples sent on trial. Kristee 61, Akron, Ohio.

PROFITS Unlimited in your own wholesale buying service. Save yourself 66 2/3% on 10,000 nationally advertised appliances, homewares, jewelry, sporting goods. Big profits selling others at discount! Free details. National Buyers Service, Box 426EC, Oakland, California.

TALKING Christmas cards say aloud "Merry Christmas." Six samples only \$1. No duty, refundable. Talkie Cards "A," Box 265, Station "B", Montreal, Canada.

AMAZING Profits for you selling Sunshine quality Christmas cards. No investment or experience necessary. Nationally famous 21 cards for \$1.00. Sells on sight! Imprints, Currier-Ives, religious, gift wraps, many others. Samples on approval, write: Sunshine Art Studios, Inc., Dept. PM-10, Springfield 1, Mass. Pasadena 3, Calif. (Note: East of Rockies address Springfield office.)

FEATHERBIRD Pictures from Mexico! 100% fast, easy profits. Prompt service. Free details. Jacaman (PM-10), Box 1342, Laredo, Texas.

BUY Wholesale thousands nationally advertised products at big discount. Free "Wholesale Plan." American Buyers, 629-R Linden, Buffalo, N. Y.

MONEY For Xmas! Make \$50 and more during spare time. Friends, neighbors—everyone buys from Elmira's exquisite new sparkling line. Imprinted Christmas cards for as little as 3c. Personalized stationery, napkins, large gift wrappings with free accessories, ribbon ties. All fine quality money saving values. No experience needed. Send name and address for free portfolios, catalog, assortments on approval. Bonus plan. Elmira's "portable gift shop" makes money first day. Write today. Elmira Greeting Card Co., Dept. C-201, Elmira, N. Y.

REVOLUTIONIZES Rubber stamp business. 100% profit. Send 10c for sales plan. Fisher's, Dept. EM10, 4736 So. Central Ave., Los Angeles 11, Calif.

BEAUTIFUL Feather pictures. 200% profit! Free sample. Apartado 9036, Mexico 1, D. F.

AT Last! Something new and sensational in Christmas cards. Make extra money fast! Show satins, velours, metallics. Gets easy orders. Pays up to 100% cash profit. 30 free samples. With name 50 for \$1.50. Big line. Amazing new Glitter-Brite ornaments, napkins, gifts, stationery. Several \$1.00 boxes on approval. Puro Greetings, 2801 Locust, Dept. 440-M, St. Louis, Mo.

MAKE Money fast—For yourself, church, organization. Selling friends, neighbors big value \$1.00 and \$1.25 Christmas and all occasion greeting cards. Leading 21 card boxes, religious and novelty assortments. Gift wrappings, stationery, children's items, gifts, gadgets. Deluxe imprinted Christmas cards. Over 200 items. Profits to 100%. Experience unnecessary. Free gift for promptness. Bonus. Free selling plan! Samples on approval. Hedenkamp, 361 Broadway, Dept. PM-35, New York.

AGENTS Wanted; Make much money selling famous "Sweet Georgia Brown" beauty products. Hair pomade, face creams, face powder, perfumes. Write for free sample offer. Valmor, 2451-KB Michigan, Chicago 16, Ill. USA.

MAKE Money introducing world's cutest children's dresses. Big selection, adorable styles. Low prices. Complete display free. Rush name. Harford, Dept. M-4341, Cincinnati 25, Ohio.

MAKE Money at home as renewal headquarters for all magazines. Big Christmas sales profits now. Liberal commissions. Supplies furnished. Write for free catalog. McGregor Magazine Agency, Dept. 509A, Mount Morris, Ill.

BUY Wholesale—25,000 items. Catalog 25c. Matthews, 1472-B1 Broadway, New York City 36.

FREE New 1954-55 wholesale catalog free. Appliances, household items, toys, gifts, jewelry, refrigerators, radios, air conditioners, washing machines, freezers. Hundreds of items on which you can make a handsome profit. Space on cover for your own name and address. Write today for big wholesale illustrated catalog free. Halen, Inc., 125 Fifth Ave., Dept. M, New York, N. Y.

YOUR Own business! Amazing profits! Constant repeat orders! Start a permanent business. Steady income. America's fastest selling household and industrial article for 35 years. Tremendous market! Sells quickly! Exclusive territory! Write now for special no-risk offer. Dominant Products, 359 Pearl St., New York 38, N. Y.

FREE Hosiery! Sensational new way to earn to \$3 hour spare time! Introduce amazing hosiery by giving away free pairs to every man and woman, regardless whether or not final purchase is made! Nationally known luxurious nylon stockings guaranteed against runs. New miracle one size two-way stretch nylon socks, fit any size. Never sags or droops. Guaranteed one full year! Buy nothing. Deliver nothing. Advance cash plus huge cash bonus to 40%. Additional hose and gifts extra bonus. Postcard brings you samples of stockings and socks with money-making outfits absolutely free. No obligation. Kendex, Babylon 73, N. Y.

GOOD, Steady income. Magica Rust Spot Remover. Tutechon furniture cleaning, polishing and revitalizing cloth. Nothing like it. Your profit 100%. Magica Products, Andover, Mass.

EARN \$100 Cash and more by Christmas plus valuable contest prizes! Just take friends' and neighbors' subscription orders for all magazines. Write today for free supplies to J. Foster, Coronet Agency, Dept. M, 488 Madison Ave., New York 22, N. Y.

ADVERTISED Watches, diamonds, pens, wholesale. International, 61R Roberts, Portland 4, Maine.

BUY Wholesale—Thousands items. List free. A Sales, 18 PM City Terrace, Newburgh, N. Y.

APPLIANCES, Cameras, watches! Large wholesale catalogue! Cam Company, 6806PM-20th Ave., Brooklyn 4, N. Y.

ENJOY 3 Color television filter screen now easily attached. Send \$2.00 for your screen size. Satisfaction guaranteed. S. George, 5008 Stenton Avenue, Philadelphia 44, Pennsylvania.

SELL \$3 Fire extinguisher. Every car owner and household a prospect. A real money maker. Fire Killer Co., 2481 Westport St., Baltimore 30, Md.

350% SNAPPY Store signs sell! 10 signs \$1; sell \$3.50. Free lists. Southern, 1500 No. Fort, Corpus Christi, Texas.

60% PROFIT On cosmetics—Famous nationally advertised Hollywood Cosmetics pay 60%! Make \$25 day up! Hire others. For free samples, details, write Studio Girl, Glendale, Calif., Dept. PM-104.

EASY Handwork makes fast-selling useful articles. Sample free. Sunmade Company, Brockton 64, Massachusetts.

NEW Magic fabric selling like wild. Sample free. Write Glen-Zall, 86 S. Wolcott St., Hillsdale, Mich.

AGENTS. Big money selling raised wood letters. Sign Letter Distributors, P.O. Box 101, Mineola, N. Y.

WINDOW Letters—Gold, silver, colored. Metropolitan, 316 W. 42, New York City 36.

EXTRA Money every week. I'll send you full-size Blair household products on free trial. Show them to friends and neighbors. You can make big extra profits. Write Blair, Dept. 31MT-1, Lynchburg, Va.

NEW Magic garbage can holder beautifies can, prevents rusting, animals from upsetting. Low priced, sensational seller. Free photos. Kessler Corporation, 10AG, Fremont, Ohio.

TWO New ball point pens, plain and retractable, with lifetime written guarantee. Two samples 50c. Nucleus Trading, 2440 Amsterdam Ave., Dept. M-10, New York City 35.

UNEQUALLED Christmas door knocker. Mounted brass sleigh bells. No competition. Sample \$3.50. Darchester, B114, Cincinnati 13, Ohio.

WHOLESALE Catalogue appliances, watches, tools, toys, cameras, clothing. Catalogue. Distributors Co., Box 672, Worcester, Mass.

MUSIC Greeting cards. Christmas specialties. Dorby Publications, Parsonage, Cummington, Mass.

RETRACTABLE Ball pens, top quality, big profits, details free. Davis Company, 483-A Clinton Avenue, Brooklyn 38, N. Y.

MEN—At last a d.e. razor blade unconditionally guaranteed. Made of finest quality surgical steel. At the low price of 100 blades \$1.00 check or m.o.; 25, 30c coin. Agents wanted. David Pittel, 4640 Jackson Blvd., Chicago 44, Illinois.

BIG Profits selling unique Kiddietales Giftpak. Proven, fast seller. Practically no sales resistance. Get started now. Send for free details. Pisco, 815 Locust, Pittsburgh 19, Penna.

SELL Imported slide rules to students. Hoffman, 662P, Passaic, New Jersey.

BIG Profits selling ties (\$2.00 value) \$6.50 dozen. Free catalog. Empire Cravats, 811C Broadway, New York 12.

MAGIC Thread, mends! Without sewing. Terrific seller and repeater, big profits, 30-second convincing demonstration. This amazing invisible liquid repairs, patches any fabrics in seconds. Won't wash off. Send 85c (refundable) for sample or write for more details. Utility Products Co., Vinerville, New York.

IMMEDIATE Success! Sensational profits! Used suits \$1.75, pants 35c, dresses 20c, shoes 20c. Operate from store, home, car. Free catalog. Superior, 1250-A Jefferson, Chicago 7.

EASY Extra income—Sell sensational new silicone scorch resistant ironing board cover. Good Housekeeping approved. Terrific \$1.98 seller! Send for free complete selling kit. Sample cover \$1.10. Menell Products, Dept. P—P.O. Box 431, Midtown Station, New York 18, N. Y.

HAVE A complete store in your pocket. Buy wholesale and make big profits. Send for free general merchandise catalog now. Jay Norris, Dept. P, 445 Broome St., New York City.

PRINTING. Advertising salesmen—Excellent moneymaking sideline selling decalomania name plates, small quantities. Automobile initials, sign letters. Free samples. Ralco, XL, Boston 19, Mass.

CALIFORNIA Sweet smelling beads. Sensational sellers. Free particulars. Mission, 2328PM West Pico, Los Angeles 6, Calif.

GOLD Or silver letters, numbers. Windows, doors, trucks, 1" to 6". 500% profits. Free samples. Atlas-T, 544 West 79th, Chicago 20.

\$1.00 PROFIT Selling \$2.95 photo enlargement deal. Allen Studio, Riegler Bldg., Little Rock, Ark.

MAKE Extra money. Sell front door name plates to friends, neighbors. Retail \$1.98; you make \$1.00! Free selling kit. Modern Engraving Co., P.O. Box 194, Boston 14, Mass.

AGENTS—300% Profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co., 431-D North Clark, Chicago.

IT'S So terrific you'll actually sell thousands! Brand new \$2.95 pocket check protector. Sales pouring in. A tremendous deal for you. Get your town today. Federal Products, Evanston 15, Illinois.

BARAINS, Job lots, close-outs! Save up to 50% on clothing, hosiery, notions, drugs, toiletries, gifts, jewelry, television, etc. 2000 items. 25c brings wholesale bargain catalog with special get acquainted offer which includes free \$1.00 merchandise certificate. Reliable Jobbers, 311-B North Desplaines, Chicago.

YOUR Own business—Used suits \$1.50, overcoats 65c, mackinaws 35c, shoes 12¹/₂c, ladies coats 30c, dresses 15c. Enormous profits. Catalog free. Moro, 1218AA South Jefferson, Chicago 7.

FREE—Big new wholesale catalog! Up to 50% saving for you, family, friends on nationally-known gifts, mdse.; hosiery, appliances, cards, etc. Also make money selling part time! Write today. Evergreen Studios, Box 846-AC, Chicago 42, Ill.

\$200 WEEKLY. New invention. Amazing 4-second Presto emergency tire chains, fit all modern auto wheels. National advertising building big demand. 3 sales daily to oil stations, dealers, etc. make \$200 or more weekly. Territory going fast. Write Presto Chain Co., Dept. P-30, Des Moines 2, Iowa.

SCHOOL Seniors—Be popular with classmates. Have spending money galore. Details free. Craftcards, Box 235-L, Pittsburgh 19, Pennsylvania.

SCHOOL Seniors—Earn sensational profits selling classmates America's most beautiful graduation name cards. Largest selection. Outsells all others. Free sample kit. Printcraft, Dept. M, 1509 Maple Street, Scranton 5, Penna.

FREE Directory listing. Register name, address. Receive agency offers automatically. Save time, postage. No obligation. Transamerican, Box 815-A, Atlanta 1, Ga.

SALESMEN—DISTRIBUTORS

SALESMEN, \$50.00 In a day definitely assured, selling brand new item going to every type of food and beverage store, factories, laboratories, hospitals, etc. Samples furnished. Utility Durawear, 53 West Jackson Blvd., Dept. PM-10, Chicago 4, Ill.

MAN To earn \$150 up per week. Long needed invention. Advertised worldwide. Prospects everywhere. Full or part time. Exclusive. No investment. Free use of samples. Write Red Comet, Inc., Dept. 392-M, Littleton, Colorado.

ANYONE Can sell famous Hoover uniforms for beauty shops, waitresses, nurses, doctors, others. All popular miracle fabrics—Nylon, dacron, orlon. Exclusive styles, top quality. Big cash income now, real future. Equipment free. Hoover, Dept. G-100, New York 11, N. Y.

SELL Advertising embroidered work uniforms and bowling shirts. Make big money full time, spare time. Huge selection of styles, fabrics, colors. Every business a prospect. Giant panoramic line makes sales on sight. It's free! Write Topps, Dept. 5310, Rochester, Indiana.

AD Matches! Sell amazing designs—10, 20, 30, 40 and 240-light book matches. Bigger spot cash commissions; every business a prospect. Low prices for high quality. Repeats. Start without experience; men, women; full, part time. Buy nothing! Sales kit furnished. Match Corp., Dept. PM-38, Chicago 32, Illinois.

BUY Wholesale thousands nationally advertised products at big discount. Free "Wholesale Plan." American Buyers, 630-DD Linden, Buffalo, N. Y.

SELL "Dandy"—Fast moving automotive accessory. Dandy, Box 5, Columbus, Ind.

ADVERTISING Book matches—Cash in on big demand; sell union label matches. Cuts for all businesses and political parties. Free powerhouse selling kit, low prices, protection guaranteed on repeat orders. Cash commissions. Superior Match Co., Dept. M-1054, 7530 Greenwood, Chicago.

NEW Chemical discovery. Pro Auto Wax, easy way to car beauty. Free sample, information. Amazing profits. Burford Auto Finishes, 1660-20th Street, Santa Monica, Calif.

WE'VE Got them! The hottest selling items for Christmas plus the sensational new Christmas card, "Christmas Greetings on Records." Everyone buys. Send 50c for samples or write for details. Arturo Productions, Inc., Highway 35, Neptune, N. J.

GET New shirt outfit free; make \$90.00 weekly on 5 average orders a day. Famous quality made-to-measure dress and sport shirts at \$3.95 up sell fast to all men. No experience needed. Full or part time. Write: Packard Shirt Co., Dept. 740, Terre Haute, Ind.

BABY'S First shoes bronzed for lifetime keepsakes, as bookends, ashtrays, desk sets, portrait stands. Demand unlimited. Profits big. Miniature demonstration shoe free. Senti-Metal, 236 E. Capital, Columbus, Ohio.

A Postcard can put you in a fine business! Complete line. Leather jackets, 160 shoe styles. Big commissions. No experience, no investment. Send postcard for free outfit. Mason Shoe, Dept. MC33, Chippewa Falls, Wis.

BIG Money-making opportunity. Exclusive line work uniforms. Jackets, pants, shirts, coveralls. Advertising embroidered. Every business prospect. Outfit free. Master Div., 260 Water, Ligonier, Ind.

AMAZING New hand cream. Does wonders. Entirely different. Whirlwind seller. Fast repeater. Free moneymaking offer. Sargeant Co., Highland Mills, N. Y.

AGENTS, Salesmen, buy standard brand merchandise at rockbottom wholesale prices: \$49.50 watches at \$22.95. \$49.50 dinner sets at \$15.60. \$1.00 ladies first quality nylon hose at \$6.50 per dozen. Ladies closeout \$8-\$10 fall and winter dresses at \$1.50. Other sensational values in clothing, silverware, jewelry and appliances. Minimum order \$10.00. Send \$1.00 for catalog with confidential price list. Refundable first order. Merchandise Dept., P.O. Box 66, Bronx 59, New York.

PERMANENT Awnings—\$9.95. Aluminum frames. Saves 50%. Commission deal. Sales kit, free. Smith Agency-51, Excelsior Springs, Mo.

HAIRTRIMMER \$1.00! Metal razor attachment, instantly converts Gillette and others. 110% profits! Terrific seller. Saftim, Escondido, California.

PRINTING Salesmen—Increase income. Write Acorn Print Shop, Paso Robles, California.

CHAIN Saws. Wheel mounted. Timber-brush cutting. Fall-winter. Wholesale deal. Farmco-PM, Excelsior Springs, Mo.

SENSATIONAL Demand for world's finest training course and professional equipment. Financial independence if you can qualify as our representative. Captivating sales kit. Invisible Reweaving Institute, La Mesa, California.

NEW, Marvelous foot preparation. Great for foot soreness, ingrown toenails, corns, calluses. Sells like wildfire. Quick repeater. Moneymaking offer free. Sargeant Pharm. Co., Highland Mills, N. Y.

MAKE \$15,000-\$50,000 Yearly your own business. Get exclusive franchise for amazing new "Lambert-Line" of air sanitizing, deodorizing, disinfecting chemicals and equipment needed in every office, home, store, factory. Dramatic demonstrators. Moderately priced, fast, easy sales, steady repeats. Excellent profits. Permanent. Opportunity unlimited. Write today for free facts. Lambert Research Laboratories, Dept. 18410, St. Louis 16, Mo.

MONEY Making opportunity! Take big profit orders for world famous patented varieties fruit trees. Also flowering shrubs, roses, vines. Big sales outfit free. Stark Bro's, Desk 30105, Louisiana, Mo.

QUALITY Ties—Your profit, 189%. Catalog free. Loren Specialties, 4351-A10 Flournoy, Chicago 24.

FANTASTIC New money-making plan. Sell nothing, yet make \$30 or more daily. Leave samples luxurious stainless steel tableware with women. Offer complete set free if they sell two sets to friends. Complete price 30-piece set only \$14.95 instead of usual \$40 or more, yet you make \$15 profit each transaction! Postcard brings complete money-making outfit free. No obligation. Topval Corp., Lindenhurst 10, New York.

SENSATIONALLY New, 100 year calendar, vest pocket size. Very reasonable. Sells on sight to all business houses. Big commission. Send 25c for samples. Specialties Sales Co., 339 W. Schiller St., Chicago 10, Ill.

GOOD Man can make \$3,000 next 90 days. Every house in town wants amazing NiLite glowing curbside numbers. Automatic free trial plan pays profits day after day. Write for free details. NiLite, 173 W. Madison, Dept. 312, Chicago 2, Ill.

30,000,000 WOMEN Want amazing new automatic refrigerator defroster. You sell 8 out of 10 on sure-fire free trial. \$250.00 weekly profit not uncommon. Rush postcard for guaranteed plan. D-Frost-O-Matic, Dept. T-102, 173 W. Madison St., Chicago 2, Ill.

DISTRIBUTORS. Large profits. Terrific repeat orders. Unique Italian brooms. Write Peacock, 400 Montgomery Street, San Francisco, California.

NEW Jobs open in selling! Send name, address for five free issues of Opportunity Magazine's money-making guide, listing hundreds of companies who'll pay you well, full or part-time. No experience needed. Opportunity, 28 E. Jackson, Dept. 17, Chicago 4, Ill.

EDUCATIONAL AND INSTRUCTION

BE Popular! Play piano by note. Send for Simplified Piano, Chord and Harmony Course complete only \$3.98. Coppage Enterprises, 3353 West Maricopa Drive North, Phoenix, Arizona.

COMPLETE Your high school at home in spare time with 57-year-old school. Texts furnished. No classes. Diploma. Information booklet free. American School, Dept. X745, Drexel at 58th, Chicago 37, Illinois.

BLUEPRINT Reading for machine and building trades. Train at home. Learn to read blueprints with confidence in 10 easy lessons. Literature free. Belton School, 1059D North Lawndale, Chicago 51, Illinois.

PRACTICAL Nursing—Learn easily at home, spare time. Big demand, good earnings. High school not necessary. Write for free facts. Wayne School, Dept. FG-24, 2525 Sheffield, Chicago 14, Ill.

PLAY Guitar in minutes! 66 diagrams, illustrated instructions, 8 sample songs, \$1.00 postpaid. Guitarist, Bradley Beach 3, New Jersey.

SIMPLIFIED Analytics teach algebra clearly, \$1. Another, "Science Magic" proves discoveries plainly, \$4. Both guaranteed. Ziemba, H-6123 Orchard, Dearborn, Michigan.

DIPLOMAS, Home-study, degrees. Folder #118 free. Aurea, 156 West 73 Street, New York City.

BOOKS Government surplus education manuals. Trade and vocational subjects. About one fifth regular price. Free catalog. Long's College Book Co., Dept. PM, Columbus 1, Ohio.

HIGH School—No classes. Study at home. Spare time. Diploma awarded. Write for free catalog HP-48. Wayne School, 2527 N. Sheffield, Chicago 14, Ill.

HOW To write short stories, mysteries, articles. Learn at home for career or extra part-time income. (A. Aretz sold first 2 stories for \$255.) Professional writers show you how. Send today for free book and lesson material which explain opportunities. Clip this reminder ad. Palmer Institute of Authorship, Desk TM-104, 1680 N. Sycamore, Hollywood 28, Calif.

WANT A diesel job? New opportunities to increase income. Higher pay. More money. We can help you qualify. Tools. Shop method home training. Write today! Diesel, Tractor, Heavy Equipment Division, Interstate Training Service, Dept. B-3-K, Portland 13, Oregon.

OWN Collection agency office—Pays big! Free details. Franklin Credit, Roanoke 7, Va.

UPHOLSTERY—Become professional at home. Big earnings. Free book. Write Upholstery Trades School, Dept. CR-1402, 721 Broadway, New York 3.

BE A real estate broker. Study at home. Write for free book today. GI approved. Weaver School of Real Estate, 2020C Grand, Kansas City, Missouri.

HOME Study course, drugless therapy. Free literature. Institute of Drugless Therapy, Tama, Iowa.

IT'S Fun learning a language by Linguaphone. At home, quickly, easily learn to speak French, Spanish, German, Russian, Modern Greek—29 languages by Linguaphone, world's standard conversational method. It's like living in another country. Save time, work, money. Send for free book. Linguaphone Institute, 8310 RCA Building, New York 30.

WELDING Training pays at Hobart Welding School, Box M-1041, Troy, Ohio. VA contract. Best equipment. Catalog free.

LEARN Refrigeration mechanics. Complete illustrated course. Free booklet. Mechanics School, 7217-PM South Broadway, Los Angeles 3.

METALLURGY Easily learned at home. Prepare now for this big income field. Write Fran Council, Box 150, Wildwood, New Jersey.

USED Correspondence courses and educational books bought, sold, rented. Catalog free. Educational Exchange, Summer-ville, Ga.

SHORTCUT Public bookkeeping guarantees mansized steady income! Simple instructions. Start home, spare time. Auditax, 34651BA, Los Angeles 34.

HAVE Fun learning to read, write and speak Spanish and other languages with this new fascinating, quick and easy method of playing cards. Approved by colleges. Ideal gift. Write Elco Products, 60 Holt, Dayton 7, Ohio.

LEARN Appliance service. Motors, washers, refrigeration, everything. Booklet. President, Box 73136, Los Angeles 3.

SUCCESS Begins with new ideas. Free literature. Decoray, 634-A Union St., Brooklyn 15, New York.

NEW, Uncrowded profession, part, full time. Know people. Analyze handwriting, earn big fees. Business men, housewives, doctors, attorneys, teachers use and report success from radio, writing, lecturing, teaching, consultation, court work. Trial lesson free. Give age. Igas, Inc., 414 Wilhoit Building, Springfield, Missouri.

DO You impress people when you talk? Is your voice strong, confident, self-assured—or does it lack training? Everyone needs trained voice to make most of himself. Free booklet has important facts. Write for it today. Perfect Voice Institute, 210 South Clinton, Studio 2KW-2, Chicago 6.

SMASH Worries, problems with our life-changing "Behavior Control Method." Exciting details free. Applied Christian Psychology, Box 1924-E, Louisville 1, Ky.

INCREDIBLE! Become mental superman overnight! Free booklet! Bilou, Box 1727-MR, Hollywood 28, California.

CORRESPONDENCE Courses, books, rented, sold, bought. Catalog free. Press, Box 1272-P, Burbank, Calif.

PORTO-Lab—Portable classroom laboratory. Elementary science equipment. Manual (21 subject sections, 185 experiments). Complete unit \$36.50. f.o.b. New York. Porto-Sales, Dept. 1054, Morrisonville, Illinois.

DRAFTING—Learn from registered professional engineer. Lowest priced simplified method. Placement service. Write Genco, 32-B Greenacre Road, Westwood, Massachusetts.

WORK For U.S. gov't! Men—women, 18-55. Start high as \$350.00 month. Qualify now! 23,000 jobs open. Experience often unnecessary. Get free 36-page book showing jobs, salaries, requirements, sample tests. Write: Franklin Institute, Dept. W-24, Rochester, N. Y.

MIDLAND Linotype School. Charles City, Iowa. Civilian and Veteran Courses. Free placement. Established 1909.

MEDICAL Laboratory technique. Learn at home. Catalog free. Century College, 9 East Ohio, Chicago 11, Illinois.

CORRESPONDENCE Courses, educational books bought, sold, rented. Catalog free. Willard Bayles, 211 Essex, Hackensack, New Jersey.

HIGH School diploma at home. Licensed teachers—Approved materials. Southern States Academy, Box 144-MX, Station E, Atlanta, Georgia.

STUDY By correspondence for Doctor's degree in Psychology, Metaphysics and Divinity. College of Divine Metaphysics, Dept. P-M, 2811 North Illinois St., Indianapolis 8, Indiana.

SECRET Investigation. Experience unnecessary. Investigators particulars free. George Wagner, M125 West 86th, New York 24.

PHYSICAL Therapy and massage. We train you at home. Earn big profits from your own private practice or work with hospitals and doctors. Free catalog. National Institute, Desk 4, 4868½ Sheridan Road, Chicago 40, Illinois.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay \$3.50 lb. We paid Babbit \$4,165.00 in few weeks. Free book. Washington Mushroom Ind., Dept. 174, 2954 Admiral Way, Seattle, Washington.

EARN While you learn. Auto and diesel mechanics master this top paying trade. Many graduates earn \$100 a week and up. Approved for Korean veterans. For free information write Dept. No. 256, Nashville Auto-Diesel College, Nashville 3, Tenn.

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week" bookkeeping and tax service. Full or spare time. Details free. No obligation. Ellis, Box 200, Cedar Grove, North Carolina.

MEDICAL Laboratory technicians in great demand. We train you in your own home. Catalogue free. Imperial Technical Institute, Box 973-J, Austin, Texas.

INVESTIGATOR Training. Phillips Secret Service System, 1917-B North Kenneth, Chicago 39.

USED Correspondence courses and books sold and rented. Money back guarantee. Catalog free. (Courses bought.) Lee Mountain, Pisgah, Alabama.

UNIVERSITY Degrees by residence and correspondence. Golden State University, Hollywood, Calif.

GOVERNMENT Position! Home training for examination, \$9.95. Refunded if don't pass. Write, Ozment Instructions, 34-CS, St. Louis, Mo.

AUCTIONEERING. Be an auctioneer. Earn big money. Term soon. Write for catalog. Kansas City Auction School, Suite 307 Shankman Building, 3119 Troost, Kansas City, Missouri.

PIANO Tuning pays. Learn this profitable profession at home easily with patented Tonometer and mechanical aids. No knowledge music necessary. Diploma granted. Write for booklet. Niles Bryant School, 3731 Stockton Blvd., Dept. P, Sacramento 26, California.

CAMERA Repairmen greatly needed! You can learn manufacturers' service methods at home, in your spare time! Free, big illustrated book tells how! Write today. National Camera Repair School, Dept. PM9, Englewood, Colorado.

"INDUSTRIAL Drafting Opportunities." Free booklet. Write—Industrial Training, 1704-A Frederick, Fort Worth 7, Texas.

PLAYS, STORIES, MANUSCRIPTS

WRITERS! Earn cash re-writing newspaper clippings. Particulars. Underhill, Beebe, Arkansas.

NO Luck finding a book publisher? Write for free Booklet PM. Vantage Press, 120 W. 31, New York.

HAVE Your book published by Nelson-Hall, 204 South Clinton, Chicago 6. (Founded 1909). Free details.

BUSINESS SERVICE

100 ELECTRIC Individually typed, edited letters; resumes; (20) lines \$5 postpaid (25c each extra line); send payment, copy: Nelson Typing Specialists, 34 Park Row, New York City.

SPECIAL SERVICES

INFORMATION On anything. Ferguson Research Specialists, 116-14 141 St., South Ozone Park 38, N. Y.

OPPORTUNITIES In sunny California. Help wanted ads air mailed \$1. Hays, Box 24488, Los Angeles 24, California.

LETTERS Remailed from France, England, \$1.00 each, six for \$5.00. Box 78, Arverne, N. Y.

HELP Wanted ads New York City 50c, letters remailed 15c. Bouris, 146-42 61 Road, Flushing, N. Y.

CARTOONING, COMMERCIAL ART, SHOWCARD & SIGN PAINTING, TATTOOING

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 910C, Pleasant Hill, Ohio.

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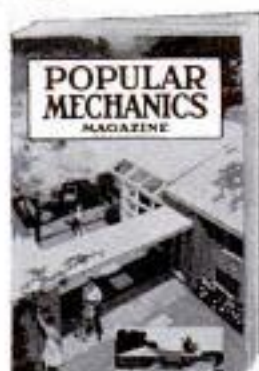
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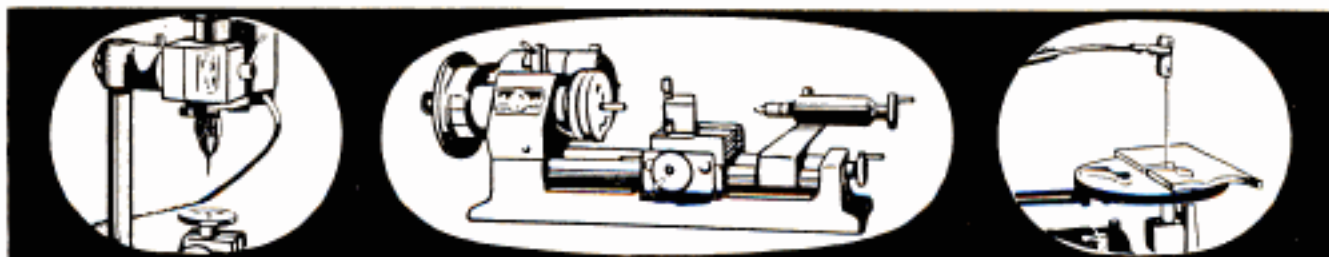
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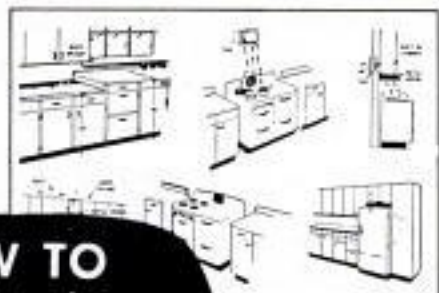


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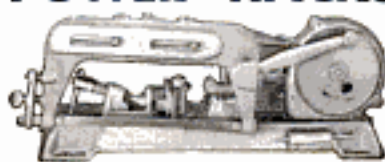


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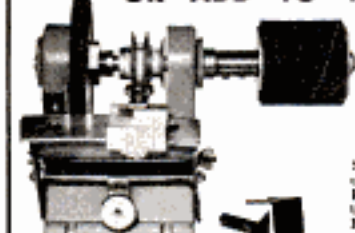
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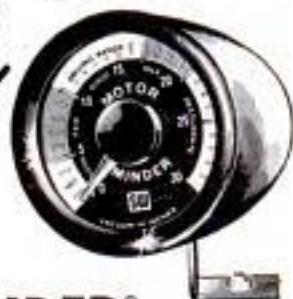
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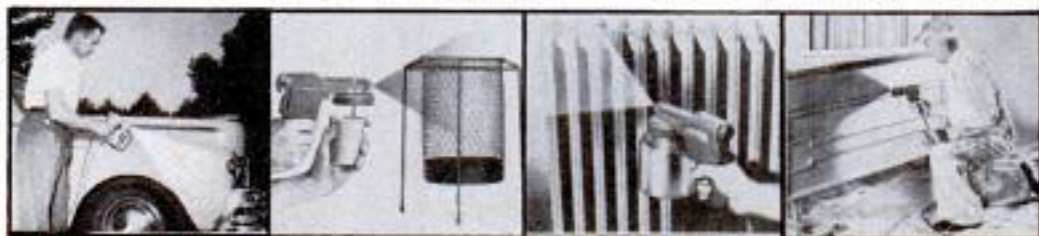
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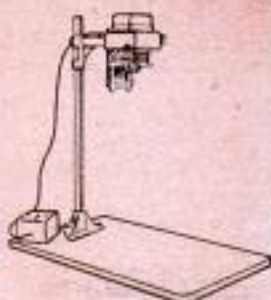
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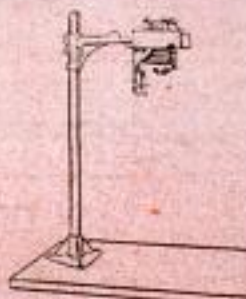
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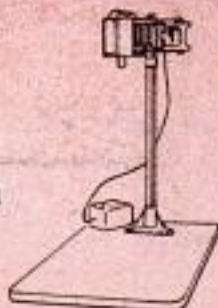
Used vertically, your Century Graphic-Graflarger gives enlargements up to 11" x 14".

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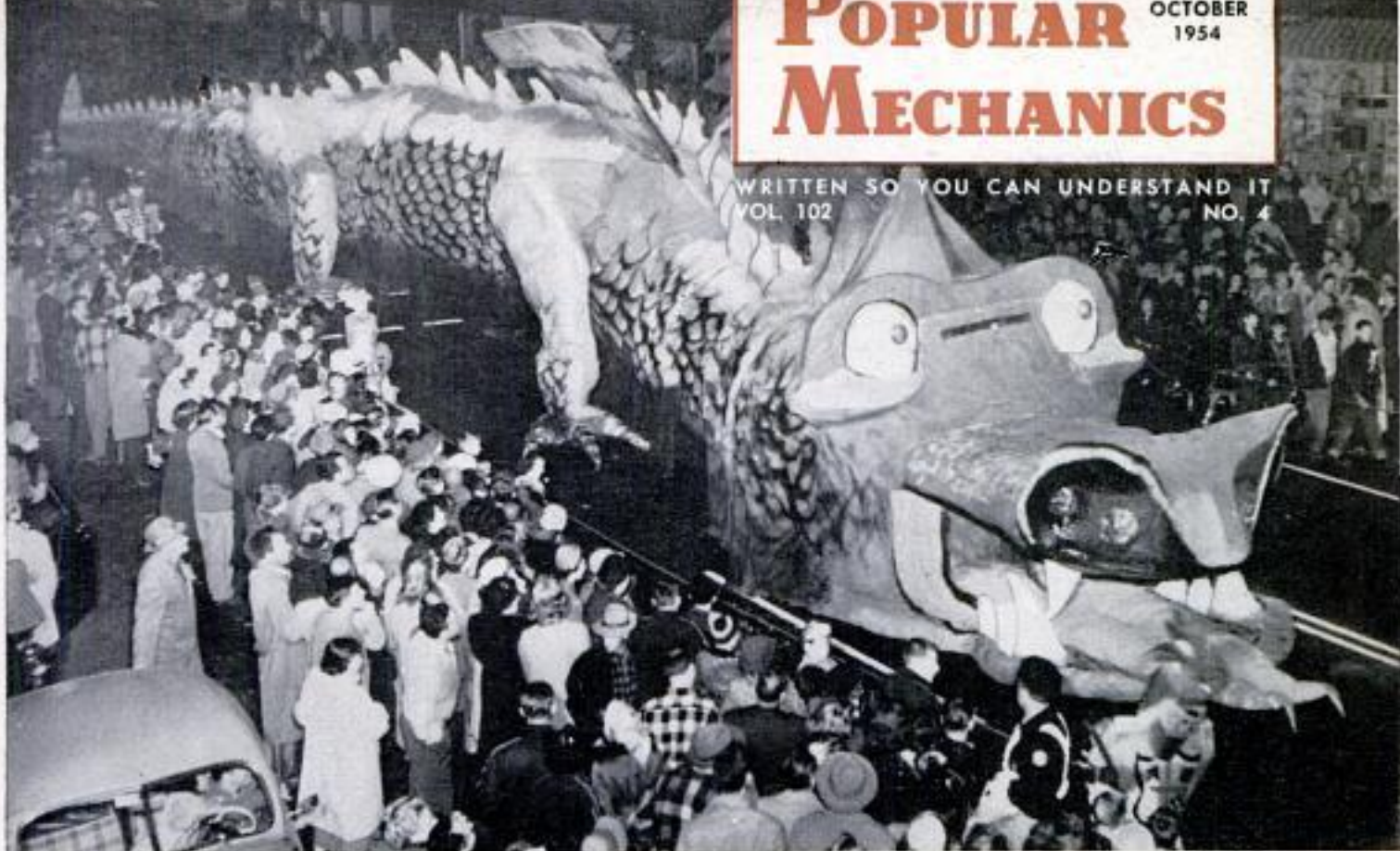
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Pitt the Dragon, 165 feet long, slinks down the street, eyes rolling, tongue flicking, feet squishing down

MONSTERS ON PARADE

By Clifford B. Hicks

ONCE UPON A TIME long, long after the last knight in shining armor killed the last dragon, the children who dwelt in the town of Pittsfield in a place called Massachusetts learned that a monster was loose roundabout. Two men had come across the footprint of a strange, huge creature in a near-by swamp.

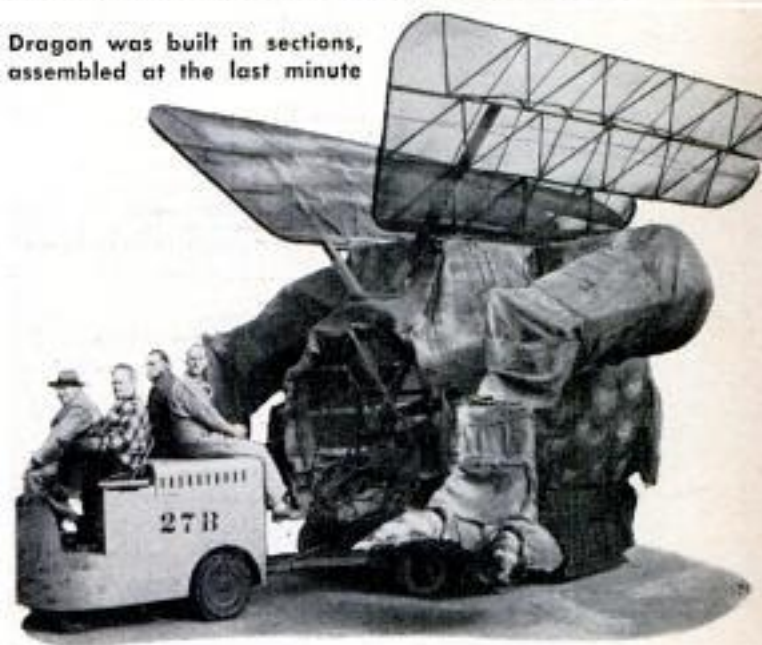
The townsfolk bolted the doors of their homes that night and the children covered their heads in their beds, wondering whether it would be safe to roam the dark streets on Halloween which, as it happened, was just a few days away.

But on the witching night the brave menfolk led their families out into the streets for the Halloween parade, just as though the monster weren't lurking near by. And the children clapped their hands as the parade passed by, though they kept glancing over their shoulders.

Then suddenly the monstrous monster appeared on the street, slinking along at the end of the parade. It was a dragon to end all dragons. Sixteen feet high it was, with scaly fins running down its back, a

tongue 13 feet long darting out of its mouth and bloody eyes 18 inches in diameter rolling at the crowd. Dragons, of course, have wings, and this beast had 24-foot wings that flapped above its back. As each huge

Dragon was built in sections, assembled at the last minute





Hazel the Witch, 23 feet high to the tip of her hat, stands ready for the parade with her devils and bats

foot came down upon the pavement the claws squished out. An endless beast it seemed, measuring 165 feet from its huge flared nostrils to the weaving tip of its tail—more than half a block of dragon slithering through the town. Yet it wasn't such a fearful beast after all for, if you looked closely, you somehow got the feeling that it was a friendly sort of a creature that wouldn't harm the smallest child.

Skilled metalworkers built Hazel's framework and molded her huge skull while electricians installed loudspeakers, lights, and women helped with costume

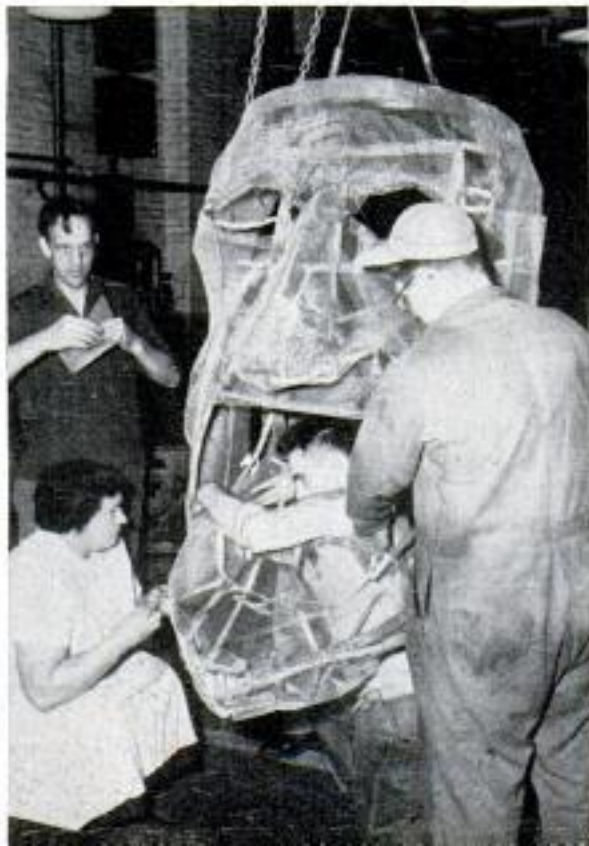
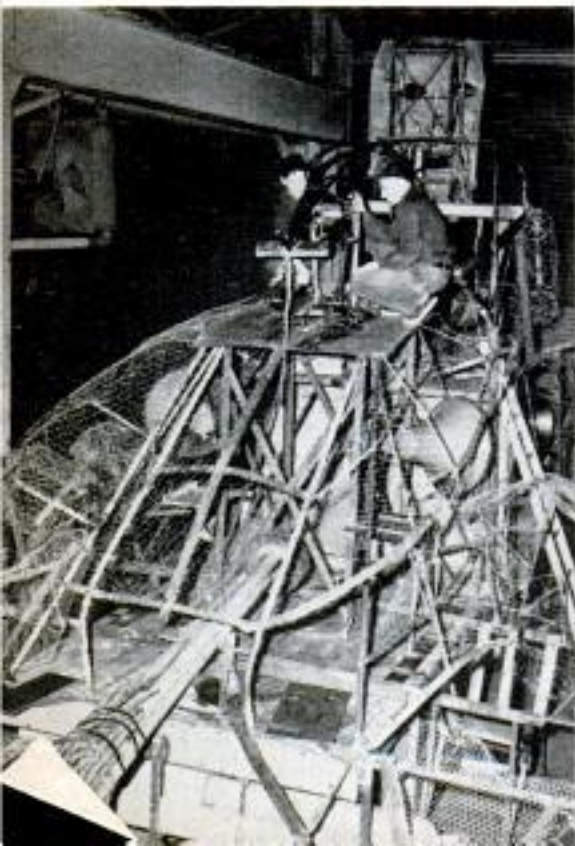
The monster crawled over to the city park where the excited kids gathered roundabout to spend the evening. And, for the first time in many years, there wasn't a single bit of damage done in all of Pittsfield that entire Halloween!

What the townspeople couldn't see were the nine men inside the dragon's stomach. They rode an electric fork truck and nine trailers, and operated all the intricate mechanisms that made the dragon walk, wag its tail, open its mouth, roar, flicker its tongue and shoot smoke out its nostrils in a realistic manner.

Pitt the Dragon was very likely the longest parade float ever to roll down a crowd-lined street. Everyone who saw him two years ago was convinced that he was the most spectacular float that ever could be built. But last year, when the people of Pittsfield turned out for their Halloween parade, they saw two floats that were equally sensational—Hazel the Witch and the space ship.

All three floats were built by rank amateurs in the float-making business—the workers of the big General Electric plant in Pittsfield. Ordinarily these welders, electricians, draftsmen, managers and sweepers turn out big transformers and other electrical gear. But once a year they pool their talents to build out-of-this-world creations for the kids of their home town. They have become so adept at it that last year 65,000 people turned out to watch the parade in a city that has a total population of 54,000!

The story of Pitt the Dragon, Hazel the Witch and the space ship goes back about a month before Pitt first "walked" the earth. A few of the workers at the General



Electric plant conceived the idea of building a float—a small one—for the Halloween parade. Forming a committee, they asked management's permission to use the facilities of the plant in their spare time. Not only could they use the plant itself, came the answer, but the company would provide all the necessary materials, either from the scrap pile or from other sources. To the company it looked like good community relations.

What, then, would they build? A committee of 10 workers, headed by Joe Pavin, finally came up with the idea to build a smoke-spouting dragon. It was a little one, to be sure, but still a dragon.

Pledge cards were circulated through the plant to find out how many employees would be willing to give a few hours of their spare time to the project. Literally thousands of man-hours of skilled labor were pledged.

This looked good to Joe Pavin and his associates—so good that they quickly revised their plans by the simple expedient of multiplying everything by five. The planned 30-foot dragon became a 150-foot job, and eventually stretched its body out to 165 feet. Designers and draftsmen turned out drawings fast enough to keep the labor



Bats supported on welded steel chains piloted Hazel along the parade route while her big arms flapped

Five-foot cat on witch's back was covered with real sealskin. Intricate mechanism made him leap to his feet, arch his back and bare his teeth





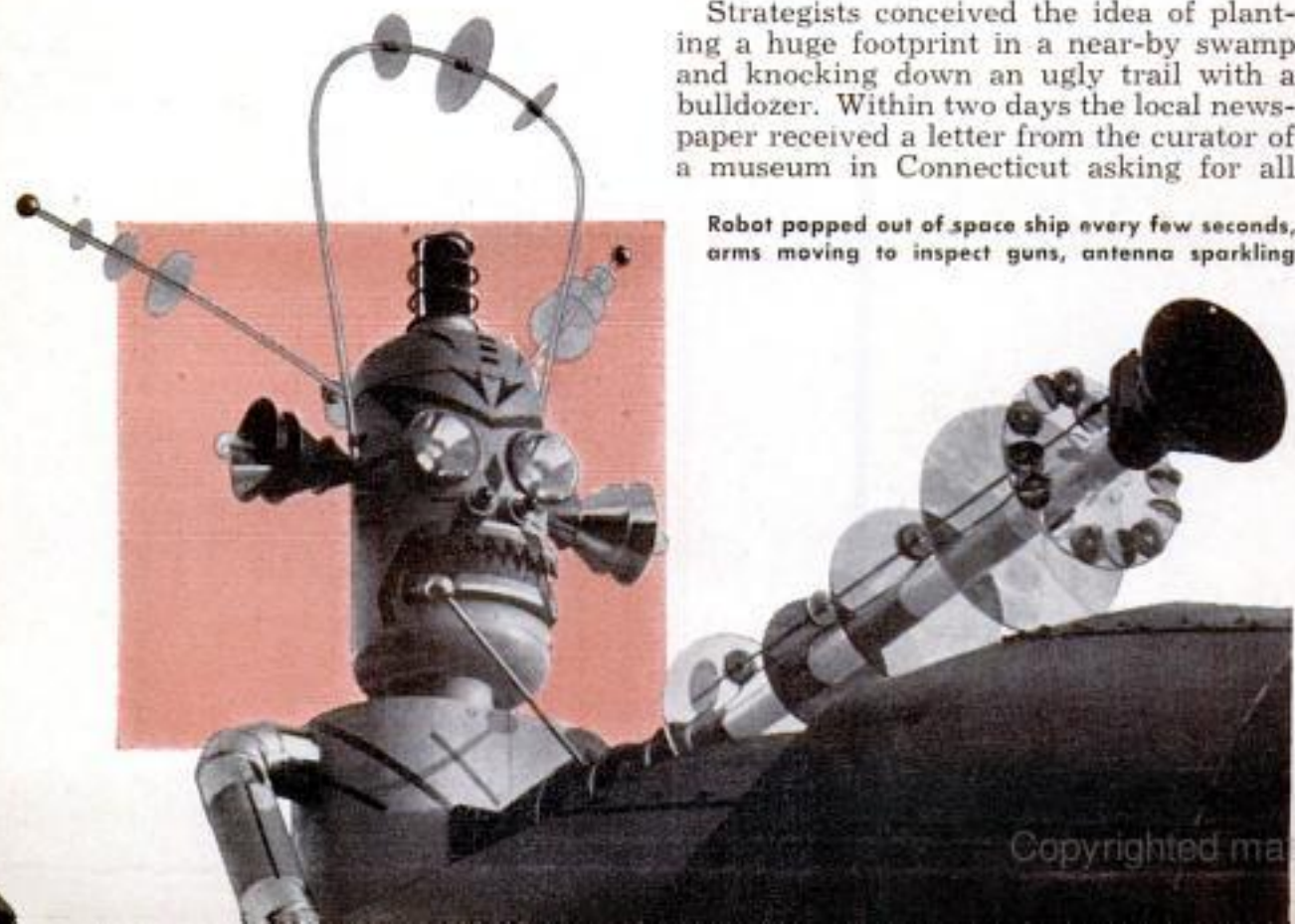
Space ship zooms down the street, jet roaring, lights flashing, guns firing popcorn balls over the crowd

force busy. Welders built the framework. Electricians laid out the elaborate lighting system. The 1000-odd workers were organized into task forces, with each group responsible for a particular segment of the giant body. Executives found themselves working under sweepers, and sweepers

found themselves reading blueprints with an insight they never knew they had.

These mechanical experts weren't satisfied just to build a huge float. The eyes had to turn in unison, the jaws had to gobble, the nostrils had to shoot out smoke (carbon dioxide) and even the mythical wings had to flap.

Strategists conceived the idea of planting a huge footprint in a near-by swamp and knocking down an ugly trail with a bulldozer. Within two days the local newspaper received a letter from the curator of a museum in Connecticut asking for all



Robot popped out of space ship every few seconds, arms moving to inspect guns, antenna sparking



Workers who built the showboat donned elaborate costumes, formed a singing group and got into the act

possible information on the monster that was roaming the countryside!

In barely 3½ weeks came Halloween, and at two o'clock that afternoon Pitt's parts were rolled out of the shop. The parade marshal, who stopped by for a look, shook his head and said the thing never could be put together. But at 8:00 o'clock that night Pitt slunk down the street to join the parade. As he left the plant, a human being, dwarfed by the monster, chased after him with a spray gun to give his tail a final touch-up.

The night the dragon walked the streets of Pittsfield will never be forgotten by anyone who saw it. Neither will his caterwauling voice, which was simply a 78-r.p.m. recording of Johnny Ray's "Cry" played at 33-1/3 r.p.m.

Pitt was such a huge success that enthusiasm ran high last year as Halloween approached. Workers of the various departments finally teamed up to build separate floats.

Hazel the Witch was probably the ugliest and heaviest creature ever built. She weighed a walloping seven tons in her huge stocking feet, made of brilliant awning material. To the tip of her hat she measured 23 feet high, and had to be designed so her head would retract into her shoulders so she could pass under electric wires. She was 22 feet long, with a skeleton made of channel steel, pipe and angle

steel fastened to a five-ton electric truck.

Her skull, built of wire netting on a steel frame, was plastered with papier-maché carefully molded into the ugliest possible features, including a wart on her nose as big as your fist. Her jaw was counterbalanced so it could be moved up and down in time to her horrifying voice, broadcast over a public-address system located between her knees. Her eyes were two spotlights (one winked out at the last minute, giving her an even more evil look than her designers anticipated) and a green floodlight between her hands cast an eerie glow over her wrinkled face. As she moved down the street on her huge broom, a series of intricate levers flapped her arms.

Suspended in front of Hazel on welded steel chains were three huge bats. Their wings flapped and their red eyes blinked on and off. Their bodies were covered with real sealskin donated by a local furrier.

Last, and probably the crowning touch, was the black cat that rode on Hazel's back. A huge five-foot creature, the cat normally sat there purring in contentment. But suddenly he would turn into a snarling infuriated beast. Leaping up, he'd arch his back, open his mouth, lay back his ears, lift his four-foot tail and scream his displeasure. He was covered with real sealskin and skunk fur.

Inside Hazel were 12 men who operated

(Continued to page 366)



Amphibious Craft Combines Boat, Automobile and Airplane

Elements of an automobile, a boat and an airplane are all combined in a strange craft built by Eldon O. McKinney of Palm Springs, Calif. The amphibious vehicle is powered by an aircraft engine and propeller. Folded up for the highway, it is eight feet wide and 25 feet long. It is equipped with a steering wheel and four-wheel

brakes. At the launching site, pontoons are unfolded from the sides, making the craft 13 feet wide. It is driven right into the water. As soon as it is afloat, the wheels are retracted. In the water the craft is capable of 13 to 15 knots. McKinney uses a hand-operated winch to help the engine in launching or beaching the craft.

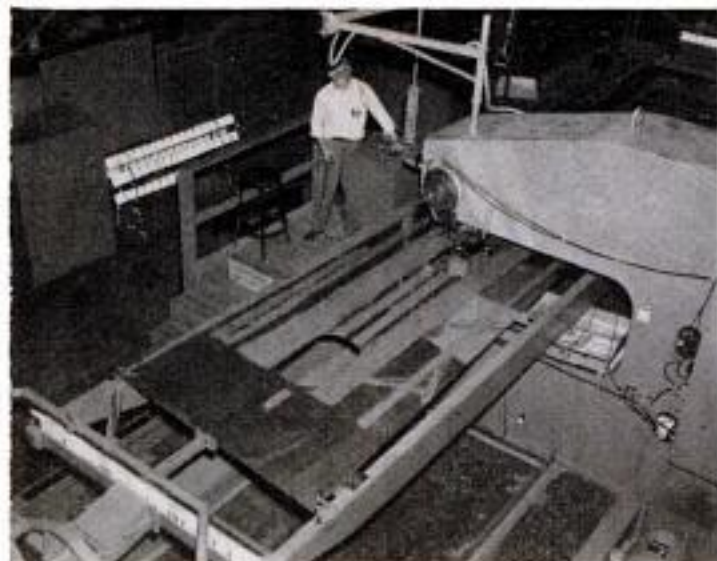


Hydraulic Wedge Topples Trees

Lumberjacks have a new tool—a hydraulic wedge that tips over trees. The portable machine replaces the sledge hammer and numerous steel wedges ordinarily used. It consists of a hydraulic pump, a power cylinder and a tapered wedge. The tree cutter inserts two blades, which sheathe the wedge, into the deep cut made by the saw. When he pumps the handle, the wedge is pushed between the blades to produce a lifting force up to 90,000 pounds, toppling the tree.

Nonfade Car Radio

There's no fading of volume in a new car radio when the automobile passes under bridges or viaducts. The radio, made by Motorola, has a built-in control that maintains a constant output of volume from the speaker.



Movie Film Operates Automatic Riveter in Aircraft Plant

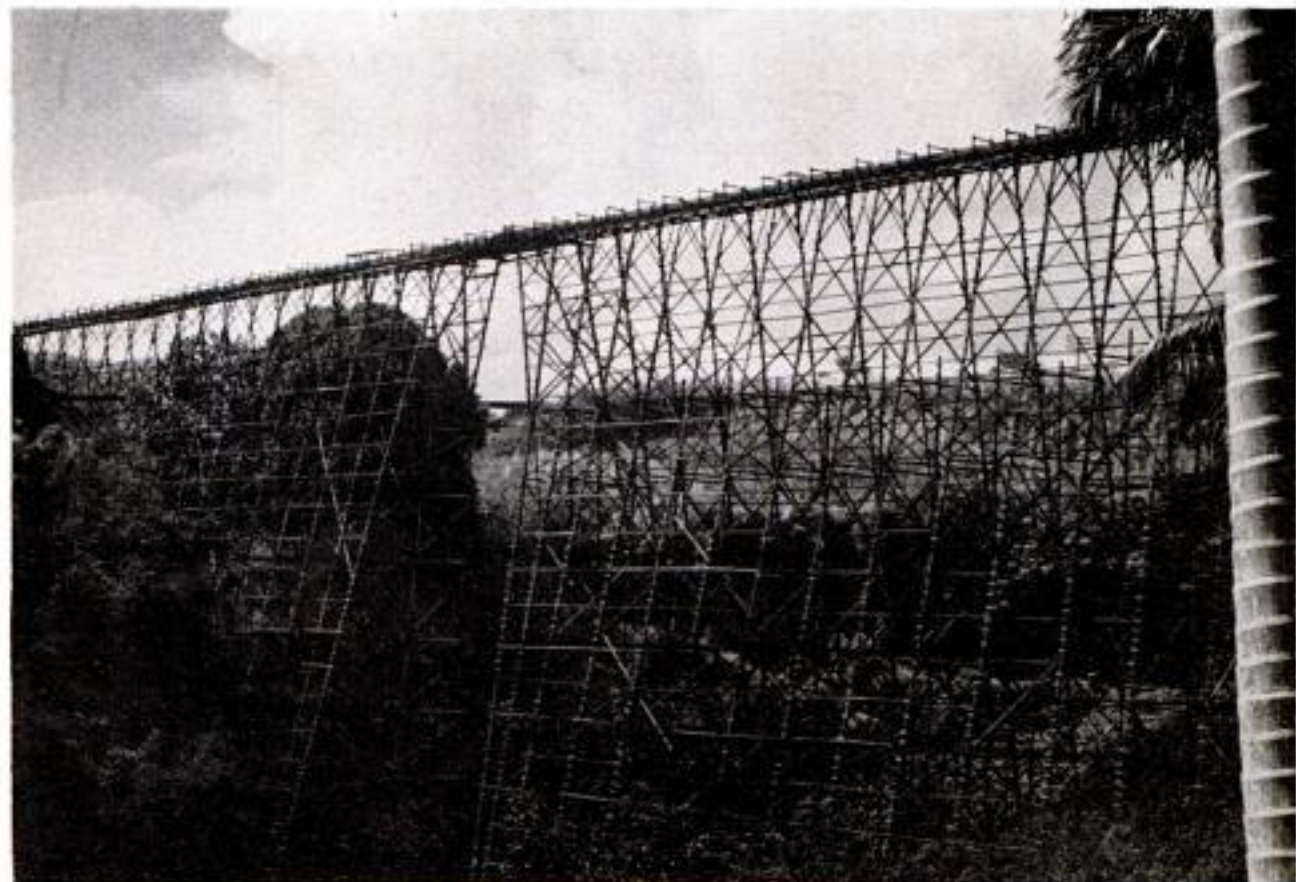
Ordinary 35-mm. motion-picture film serves as the "brains" of an automatic machine that rivets aircraft parts. Perforations in the film are felt by mechanical fingers, which relay the information to the drilling and riveting head of the machine.

Five different channels are perforated in the film. The machine, used by Convair, is guided by the film strip and drills, counter-sinks, selects the proper rivet, inserts the rivet and sets it. One man merely tends the machine instead of operating it.

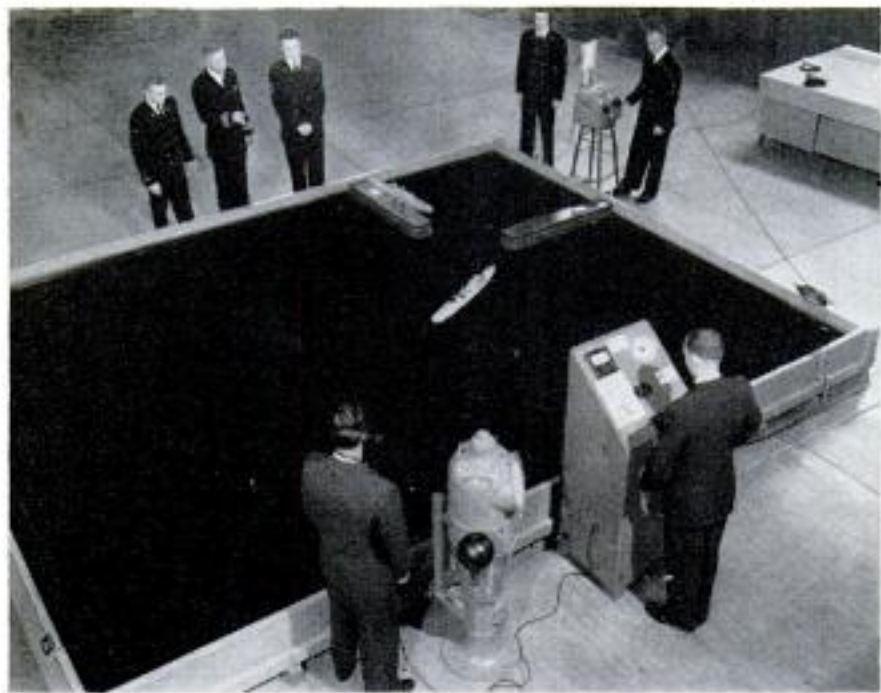
Artificial Stream Carries Sugar Cane Across Hawaiian Jungle

Few strangers can guess the purpose of an intricate structure that towers for miles above the jungle and rugged terrain bordering the Hamakua coastline of Hawaii Island, Hawaii. It's a sugar-cane flume, in

which cane is floated from the coastal fields to the mills below. The flume is a necessity for there are no streams large enough for boats and no other suitable means of transportation.



Reserve Officers "Sail" Miniature Navy Around Foot-Deep Ocean



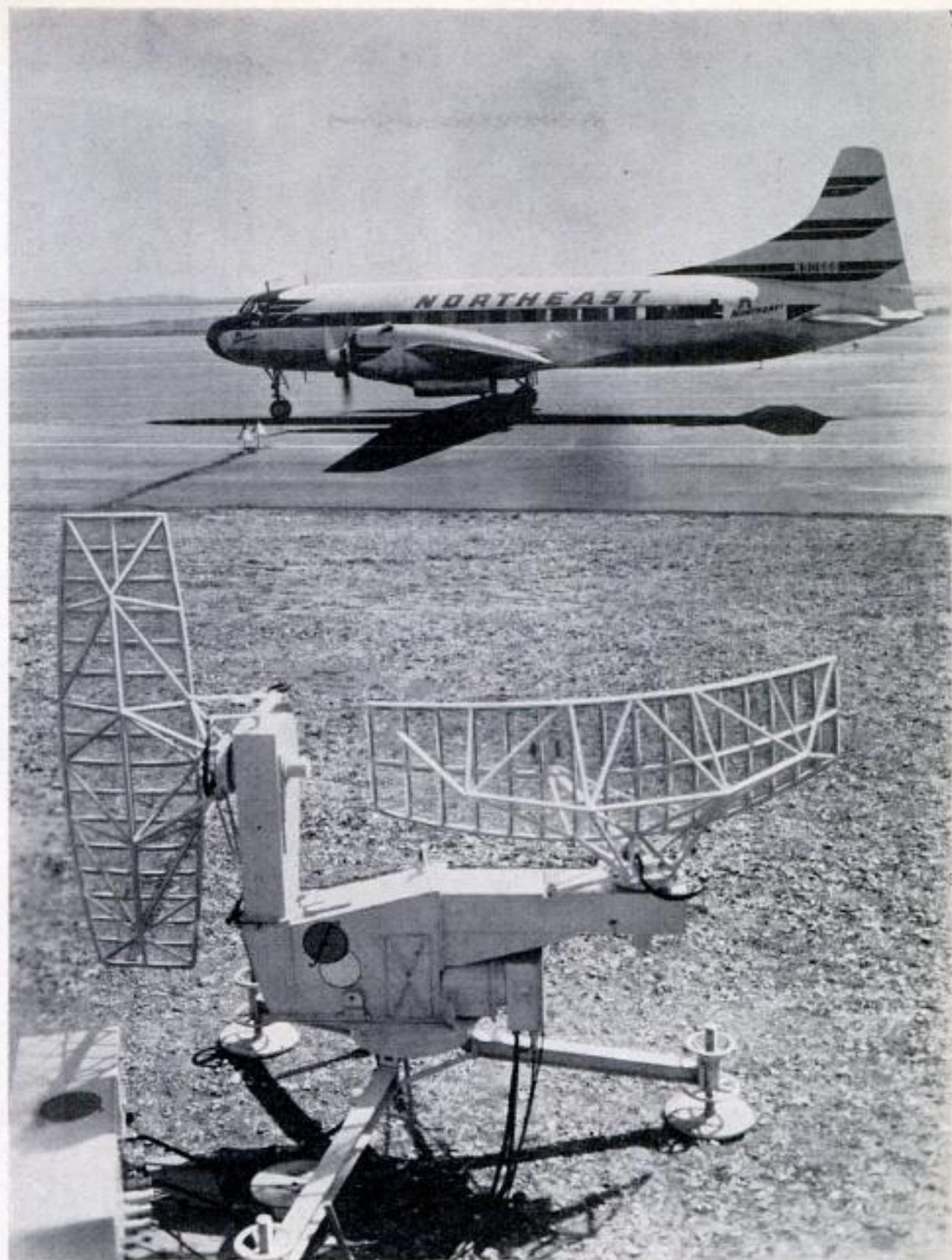
Future Navy officers "sail" a miniature ocean at the University of California in Berkeley. The men, members of the Naval Reserve Officer Training Corps, learn to handle big ships by handling models that float in a foot-deep tank of water measuring 18 by 25 feet. Along the sides of the tank are full-size controls which the future officers operate upon command. The miniature ships respond to the controls. The little "ocean" is so successful as a training device that the Navy plans to build a similar one at the Annapolis Naval Academy.

Self-Propelled Howitzer Roams Any Terrain a Tank Can Travel

Fast firing and high mobility are features of the Army's new M-44 self-propelled howitzer which can go anywhere a tank can go. The 31-ton member of the new "light-tank family" has a top speed of 35 miles per hour, will climb 30-inch obstacles, cross trenches 72 inches wide, ascend a 60-percent grade or ford streams 42 inches deep. A six-cylinder, air-cooled engine

powers the unit. It takes the five-man crew about a minute to fire each round in the 155-mm. howitzer. The unit is said to be the Army's most mobile medium howitzer, and can be put into action faster than any other medium field-artillery piece. It is primarily an artillery-support weapon, but can be used for devastating direct firing in support of advancing ground troops.





Portable Radar Unit Designed Especially for Small Airports

Almost any airport can afford a portable radar unit that can be set up in six hours and moved in 30 minutes to another runway. The approach-radar unit, built to military standards of ruggedness, features simplicity of operation and low cost. The device computes flight paths electronically

and is adjustable to a wide range of approach angles and distances. The unit, located 2000 to 10,000 feet from point of touchdown, has an accuracy of plus or minus 20 feet at touchdown. The portable unit can also be placed as far as 800 feet away from the center line of the runway.

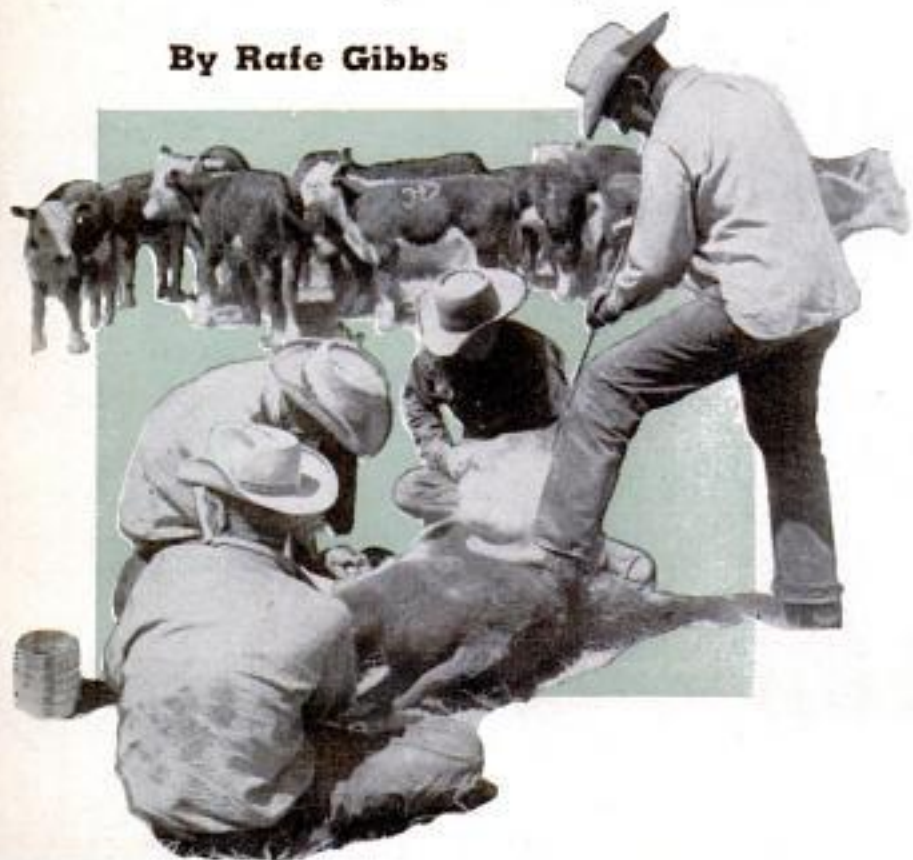


Crowell photo

Like a covered-wagon train of pioneer days, a mobile oil-exploration unit ventures into the wide-open spaces

The covered wagon gives way to the drillers' caravan, and the Northwest is a frontier again. First it was

By Rafe Gibbs



**BUFFALO,
CATTLE—
and now,
OIL**



Toxaco photo

Thunder in the "back forty"—as survey crew explodes dynamite charges and measures the ground echoes with instruments to learn the nature of underlying rock



Map shows rough outlines of Williston Basin. Over 350 strikes have been made since the first in 1951

REUBEN MOLLER, the shoeshine man in the basement of the Northern Hotel at Billings, Mont., flipped a brush from left hand to right and commented:

"Changed . . . that's what has happened to this whole country 'round here. Changed right here in my shine chair, too. Cowboy talk I could understand, but when the customers get to chinning now 'bout drilling blocks and casing scrapers I just slap on more polish and say nothing."

For 25 cents, I received both a shine and a summation of what is happening today in the Williston Basin and its fringes. Forming the nation's most booming oil frontier, the basin sprawls over 250,000 square miles of North and South Dakota, Montana, Saskatchewan and Manitoba. Nowhere is the American scene changing more rapidly. Nowhere in the United States is there more opportunity for development.

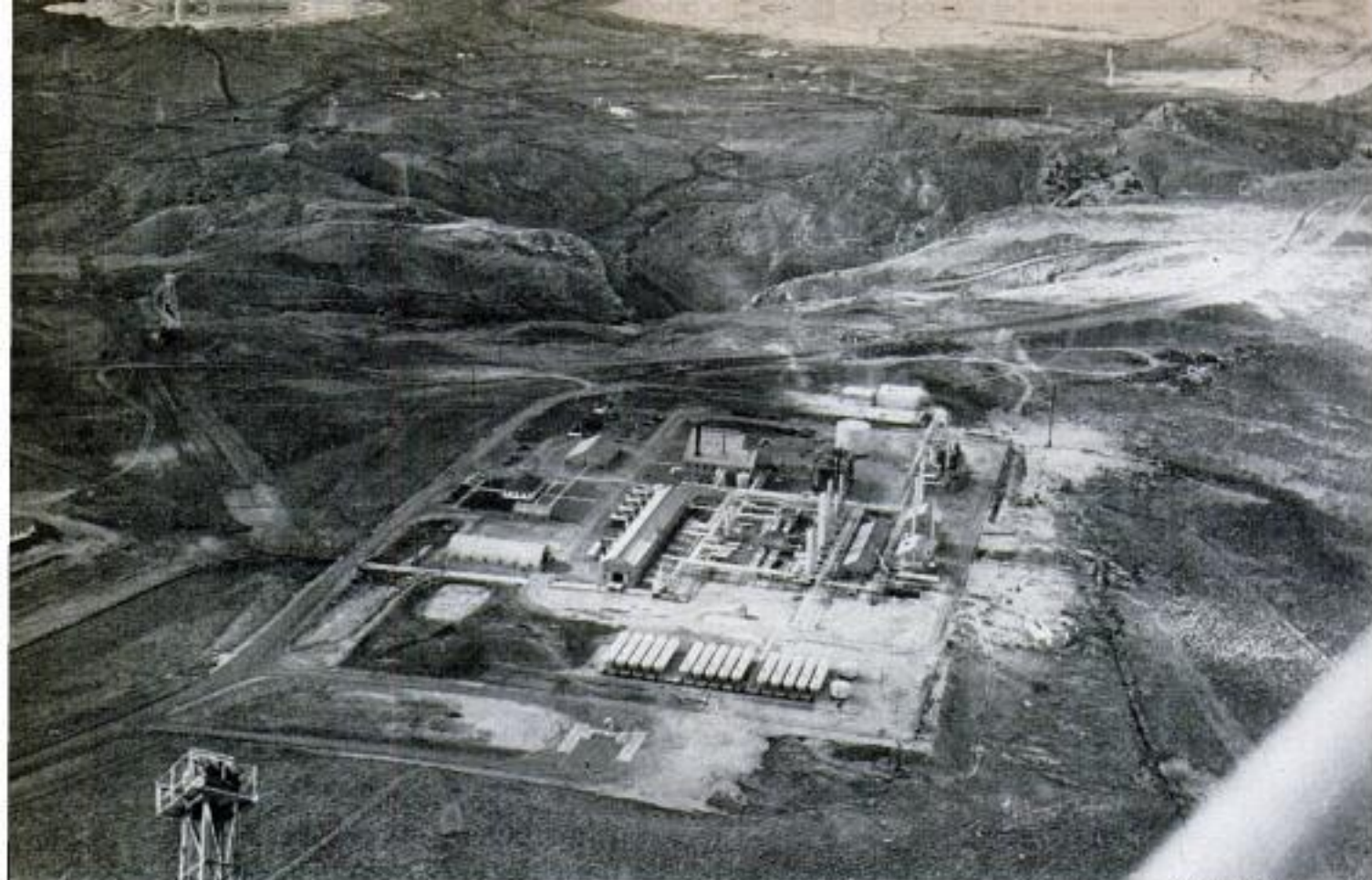
Alfred Jacobsen, president of Amerada Oil Company, put it this way: "The Williston Basin is not just another oil field. It is a whole new oil province."

Jacobsen gambled more than a million dollars and four years' time in the basin to win in 1951 with Discovery Well No. 1. Now, only three years later, the United States' section of the basin has more than 350 producing wells in 26 widely scattered fields in three different states.

In Bismarck, N. D., you get the feel of a once-tired land now charged with the throbbing energy of giant oil pumps. You notice oil brokers borrowing the shade of the hotel's marquee to ply a fast-talking curb trade in mineral rights and leases.

Then you hit Williston, N. D.—where it all started. The town lies comfortably on a terrace between the lowlands of the Missouri River and the hills and prairies. In some years, more than a million bushels of wheat were handled at Williston, which had a population of about 7000. In some years—when the rains didn't come—spiders spun their webs in the upper parts of the big grain elevators.

The years of the big dust storms blew some disillusioned folk right out of the area. For those who did not or could not

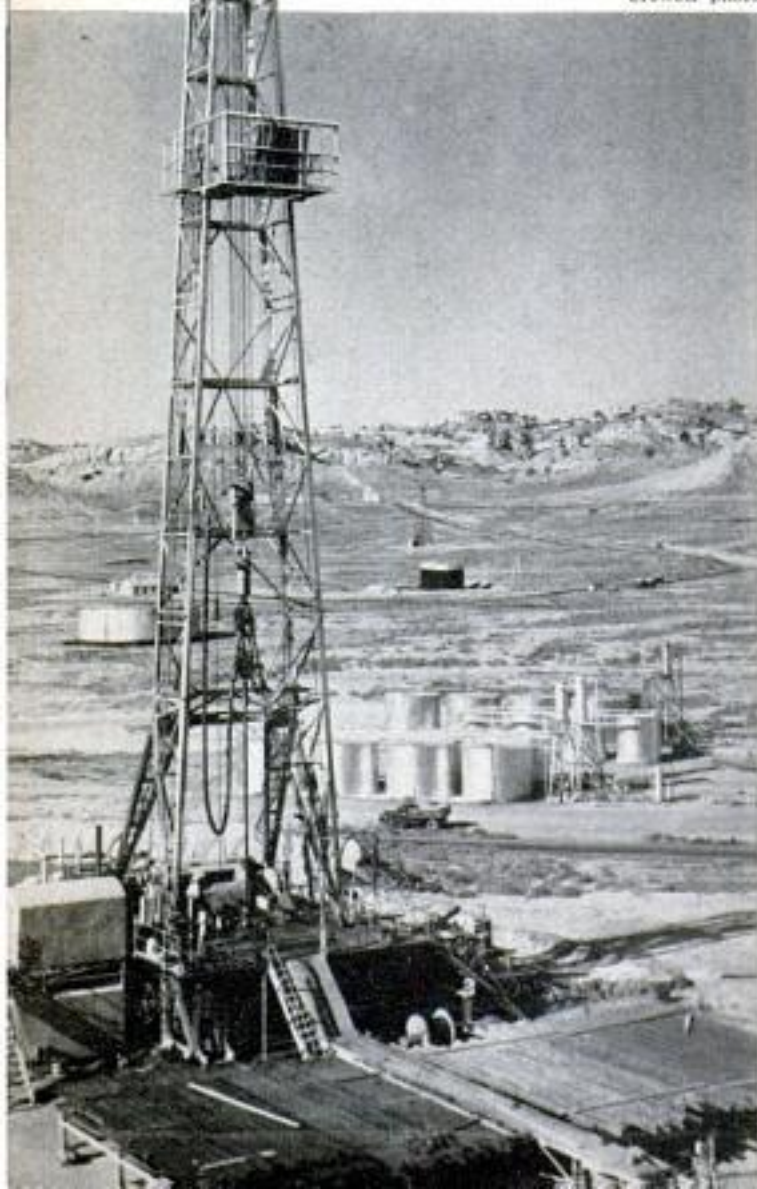


Crowell photo

New industries in the area include a gasoline plant in the Cabin Creek oil field of Montana

Oil derricks and storage tanks mark locations of 26 scattered oil fields

Crowell photo



leave there seemed little hope for the future, especially in oil.

In the thirties, one independent wild-cattling outfit after another figured there just had to be oil in the basin, which forms the largest single volume of sedimentary rocks in North America, measuring hundreds of thousands of cubic miles. Millions of dollars were poured down dry holes.

Then, in 1946, Amerada, biggest independent company in the United States engaged exclusively in finding and producing oil, started explorations. After four years of testing and mapping, Amerada's experts figured they had a likely spot on the Clarence Iverson farm about 30 miles northeast of Williston.

On April 4, 1951, Amerada brought in the basin's first oil gusher. Soon representatives of other oil companies, brokers, "rough-necks" who drill, "roustabouts" who man the pumps came like the locusts North Dakota had known in other years. Today 80 percent of all potential oil land in the basin is reported under lease. Shell Oil Company alone has leased more than 8,000,000 acres.

While the big rush was on, a farmer could hardly plow around his field without an oil-company representative approaching him. Lease rights—in effect, oil-hunting licenses—shot up to \$25 an acre. Some millionaires were made, and many speculators "turned a fast buck." Two men from Bismarck with only \$1250 to invest leased all the land they

could, then shortly sold the leases for \$56,000.

Williston's population has now almost doubled to pass the 12,000 mark. More than 250 new businesses have been added since Oil Strike Day. Particularly short is housing. An unfurnished house that once rented for \$40 a month is now good for \$140. Bank deposits in the area are up 25 percent.

Farmers with oil or oil possibilities are generally playing it safe. There are new high-priced cars parked in the old barnyards, but the owners are as likely as not to be out riding a tractor. Maybe it is because they remember the lean years of the drought period and fear that oil as well as farm crops can dry up.

In 1936, while driving through the Williston area, I noticed a farmer harvesting his drought-stricken hay crop. He had attached a basket somewhat like that used on lawn mowers behind his horse-drawn mowing machine to catch the withered bits of alfalfa that would otherwise have been lost in the dust. I like to think that maybe *that* farmer has oil on his land today.

At Glendive, Mont., I got a good view of the changed pattern on the

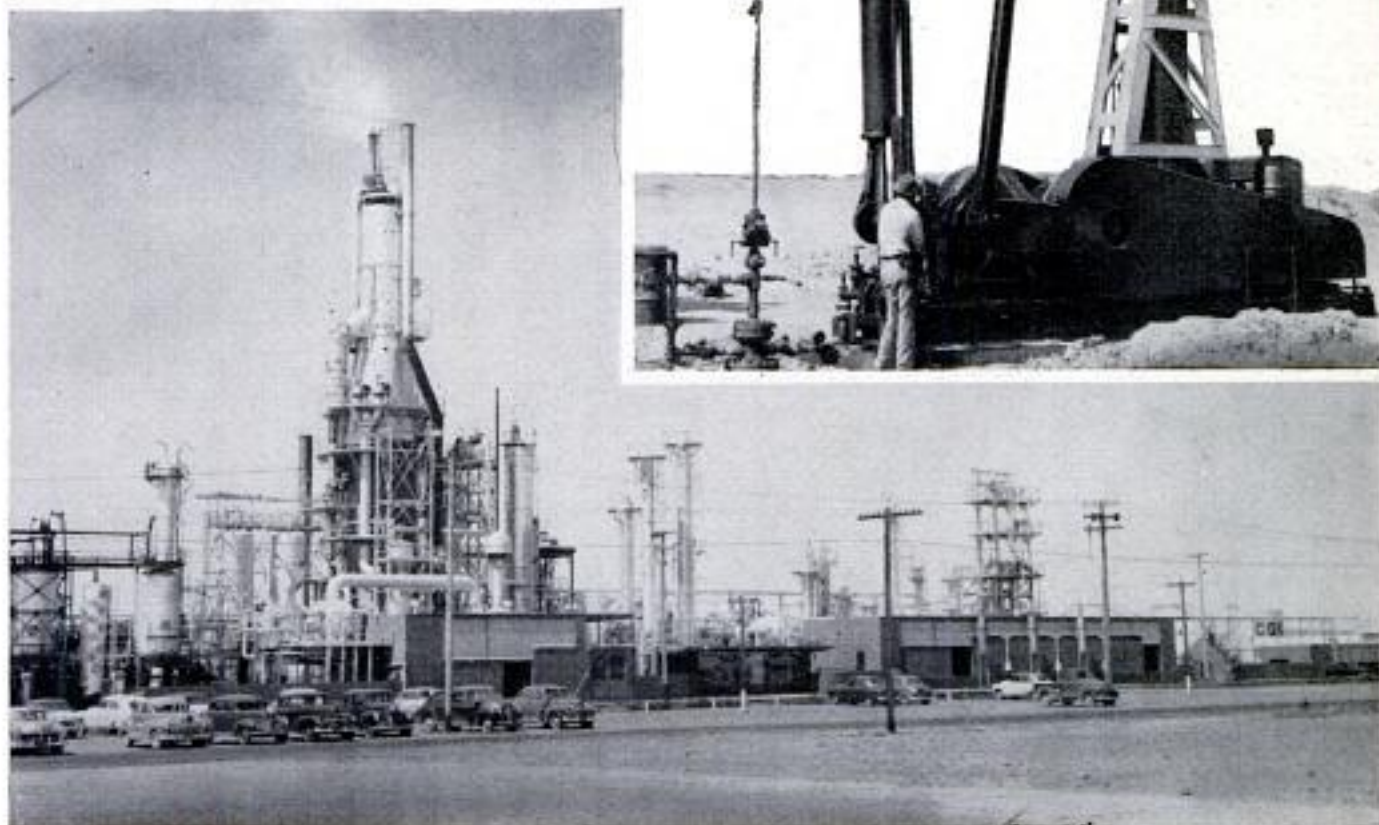
(Continued to page 262)

Oil refinery at Laurel, Mont., is close to Billings and transportation facilities



Imperial Oil photo

Helicopters are used to expedite the search for oil in rugged country. Over 50 oil companies are searching the Williston Basin, have spent millions more than they have so far received from oil. Below, a former ranch hand guards an isolated pump



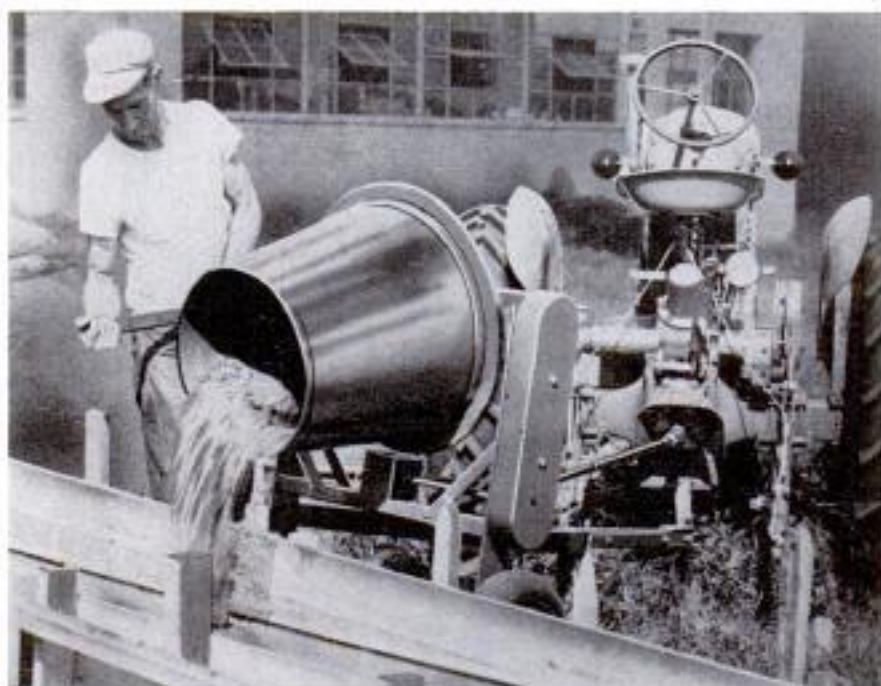
Television-Telephone Permits Face-to-Face Long-Distance Calls



You can see the person you're talking to on a new combination television-telephone—even if he's across the continent. The system is being offered to large industrial concerns for interplant use. For distances up to several miles, the two picture circuits and the two voice circuits are all carried by a single shielded wire, using different frequencies for each circuit. For greater distances, the circuits are carried by standard large coaxial cable or by microwave relays. There are no technical objections to transcontinental TV-phone hookups. Each person views himself as well as the other party on a split screen, allowing each to adjust his end of the circuit.

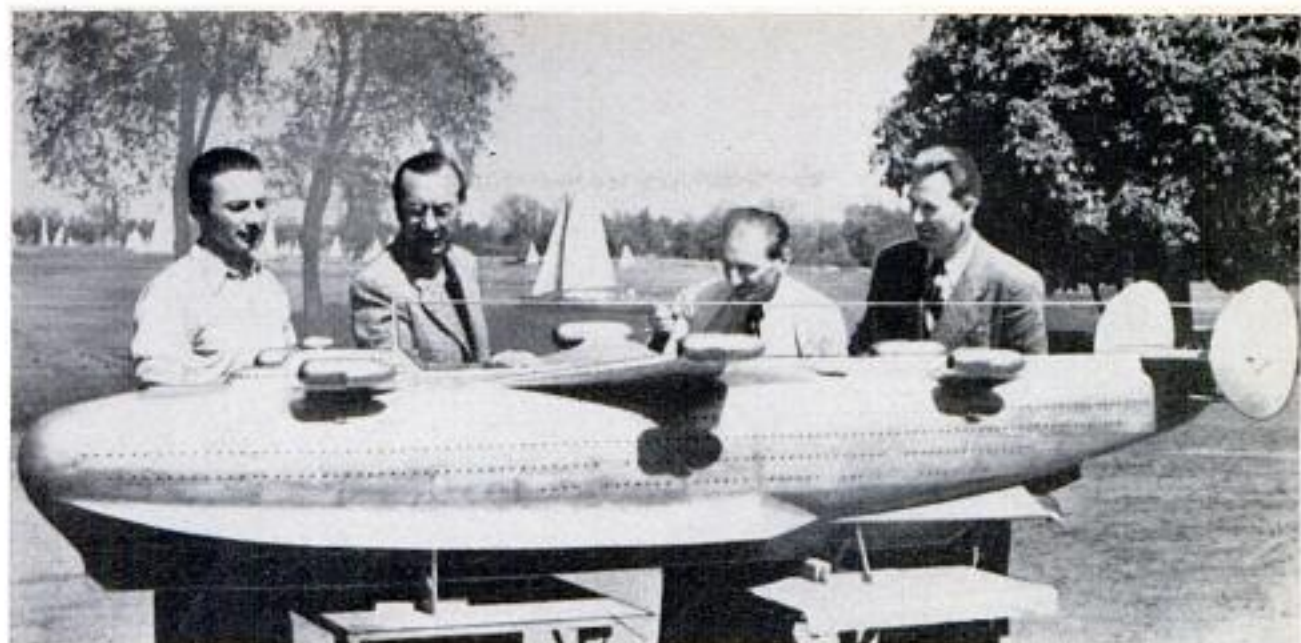
Concrete Mixer Driven by Tractor

No wheelbarrows are needed with a mobile concrete mixer that is pulled by a tractor and driven by its power take-off. It is designed for farm use. To speed operations, the mixer keeps turning as it is being moved to the job. The 7½-cubic-foot drum will deliver three to four cubic feet of mixed concrete per minute. It can also be used to mix feed, seed or fertilizer or even wash vegetables. A drum cover clamps over the opening during special mixing jobs.



Dashboard Padding Reduces Reflections

Annoying reflections from the top of automobile dashboards are eliminated by a plastic pad that is installed in one minute without tools. The pad surface is available in a variety of colors and its stippled surface prevents the reflection of sunlight into the driver's eyes. To install, you remove a paper backing and press the pad firmly in position on the dashboard.



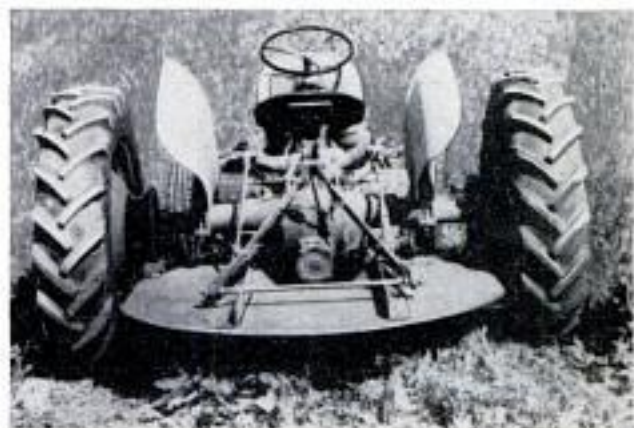
German Designer's Ocean Liner of Tomorrow Resembles Airplane

Ocean liners of the future will resemble airplanes in many ways, according to Wilhelm Fechner, a German designer. He and his assistants have built a large scale model of a ship which they hope will be built. The full-size ship would be more than 400

feet long and would weigh about 11,200 tons. It would be powered by 72,000-horsepower turbine engines, giving it a top speed of more than 80 miles per hour. Fechner says that after it reached a certain speed it would rise and plane on the surface.

Rotary Mower for Tractor Speeds Through Tall Weeds

Attached directly to the power take-off of a Ford or Ferguson tractor, a rotary mower cuts a five-foot swath through the tallest weeds at high speed. The wheels of the tractor are turned inside out to make room for the rotating blade. A plywood shield is mounted to the hydraulic lift arms and extends over the whirling mower blade. The mower is popular in the Northwest where orchardists use it to cut down tall weeds around fruit trees at high speed.



Electric Reading Aid Moves Marker Down Page

You can increase your reading speed up to 300 percent with a silent electric machine that moves a plastic marker down the printed page. The machine is adjusted to the number of words per line and set for the number of words per minute. As reading speed increases, the machine is adjusted to a faster rate.

☐ Built into the door of a new refrigerator is a tear-off dispenser for aluminum foil, which protects and speeds the cooling of refrigerated foods.



Tubeless Tire Is Repaired by Sealing Hole With Rubber Plug

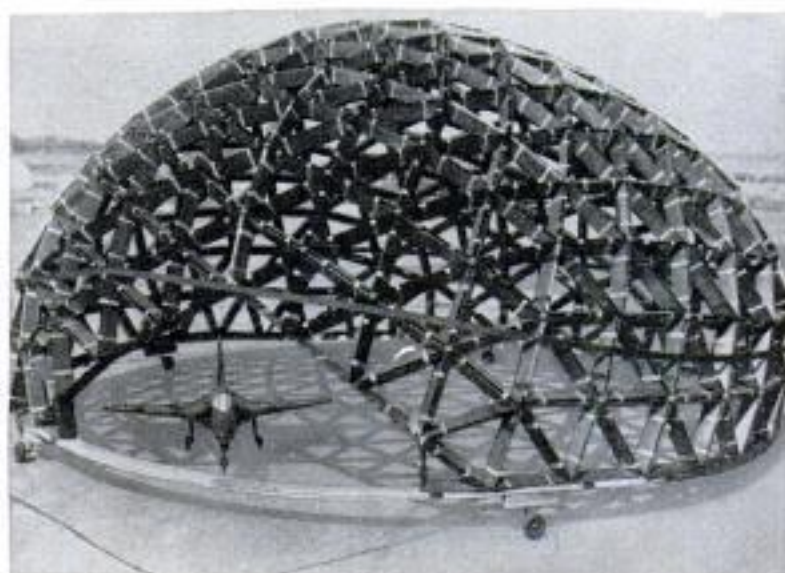
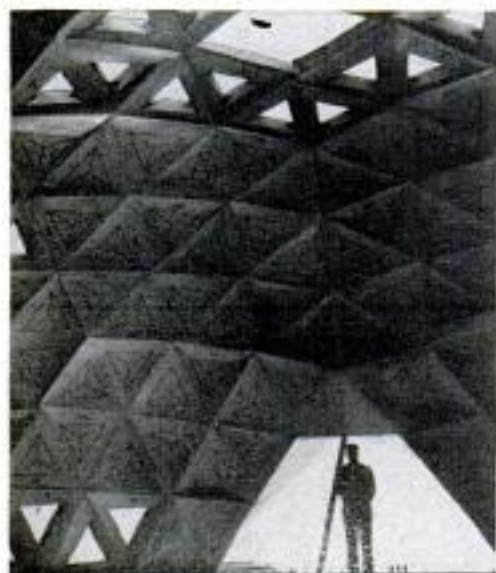
Holding air without a tube or even a tubelike liner, a new Goodyear tire can be repaired like a tubeless bicycle tire. The patching technique resembles the rubber-band-gun system of plugging holes in bicycle tires. There are a needle, some cement and rubber plugs in the repair kit. A plug is hooked over the needle, dipped in cement and forced into the hole. When the needle is withdrawn, the plug stays in, sealing the hole permanently. The tire can be driven on immediately. No tubelike liner is needed because the tire carcass itself has been made impervious to air by a special coating of the fabric in manufacture.

No puncture sealant is needed. The tire weighs less than a tire-and-tube combination, runs cooler and wears longer, Goodyear officials report. It can be installed on any rim except those with wire wheels. Although not punctureproof, the tire will not lose air when punctured by a nail as long as the nail remains in the carcass. Should the nail come out, the repair is quickly made while the tire is still on the wheel. There is less likelihood of a blow-out because there is no tube to wear or chafe. In violent starts and stops, there is no tube to shift and possibly tear out the valve stem, another cause of blowouts.

Portable Buildings Utilize Strength of Box-Stressed Paperboard

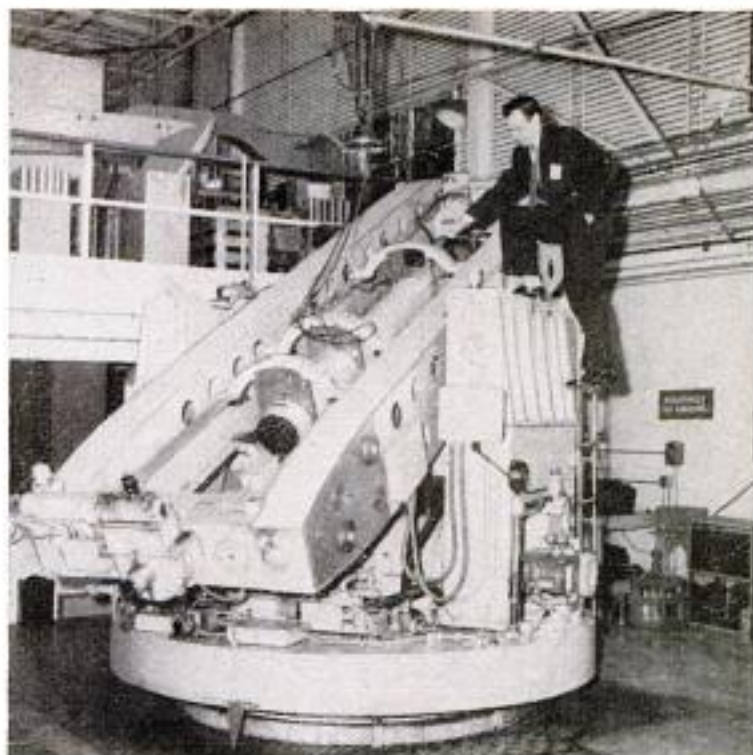
Requiring no interior supports, dome-shaped structures of box-stressed paperboard have been adopted for a wide variety of uses by the Marine Corps. Light enough to be transported by helicopter, small paper buildings can be used to shelter per-

sonnel and equipment. Larger structures, such as revolving aircraft hangars, have been made in scale model. Paper-dome buildings were developed by R. Buckminster Fuller, who is noted for his architectural innovations.



Torpedo Tries Again If First Pass Misses

Acoustics guide an experimental "homing" torpedo to its target so surely that it will turn around if it misses on the first pass. It is being tested in the Navy's new electronic torpedo tester which charts the movements of the "tin fish" just as if it were actually in the water. Using this device costs only \$4 per test, far less than a test at sea in which ships and submarines are used.



Crane Made From Scrap Lifts Farm Machinery

When heavy farm machinery breaks down on Willowbrook Farm, Erie County, Pa., the Grimshaw brothers are likely to roll out a 20-foot homemade crane to lift the equipment for making repairs. Using an arc welder, they built the crane mostly from scrap iron and bar steel and mounted it on a discarded auto axle. The entire unit, equipped with rubber-tired wheels, is readily moved to the field with a light tractor; cable is wound or released by a geared, hand-powered winch.

Venezuelan Home Anchored to Hillside Seems to Float on Air

Plenty of sunshine and fresh air are among the advantages of a strange-looking house perched on a hillside near Caracas, Venezuela. The 13-room mansion was designed by a local architect and cost between 700,000 and 800,000 bolivars (\$210,000—\$240,000). Its owner is Monreglio Oreste, a grocery-store owner and caterer who arrived in Venezuela six years ago from Italy "dead broke."

Examination of children's hair with a polarizing microscope and a refractometer roughly indicates the age and sex of the child from whom the hair came, according to a Washington University report.



Hamilton Wright photo



Chief Petty Officer McDonald, inventor of the jet gun, demonstrates how simple it is to reload the weapon

JET GUN FOR FROGMEN

FISHING CAN BE as relaxing as an armchair under a willow tree or as exciting as a jet plane. Skin divers prefer excitement with their fishing. Something new in this exciting sport is a jet-action under-

water gun designed by a U.S. Navy officer. So the big ones won't get away, a nylon line is tied to the arrowhead. If his aim is good, the diver pulls in his fish



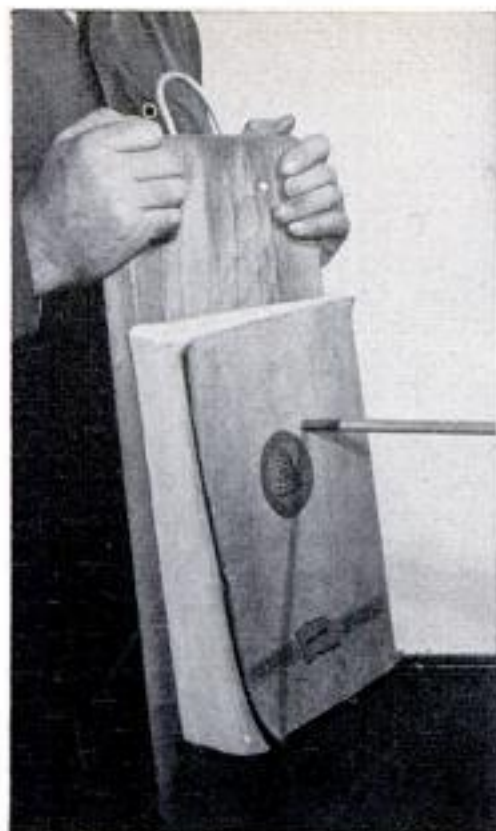
water gun designed by a U.S. Navy officer.

Chief Petty Officer Otis McDonald saw an underwater powder gun owned by a skin-diving friend of his. It was beautiful, but expensive—\$600 was its price. McDonald thought he could do better than that and, being an inventor by hobby, he went to work on it. Right off the bat, he disagreed with the basic principle—he didn't see why the propelling charge should be in the breech, as it is in the regular rifle.

The novelty of his gun lies in this principle—it is driven like a rocket by jet propulsion. McDonald reasoned that underwater the thrust given a hollow shaft would be greater than the push given to a solid one. Behind that reasoning lies the secret of this inexpensive but powerful weapon.

A blank cartridge is inserted in a removable arrowhead, which is then attached to the end of a hollow aluminum shaft 21 inches long. This shaft, with arrowhead attached, slips into the barrel and fits over the firing mechanism.

The hammer, as in an ordinary gun, forces the firing pin to explode the powder charge. Unlike



Arrow went through telephone book and into board from 20 feet. It is silent

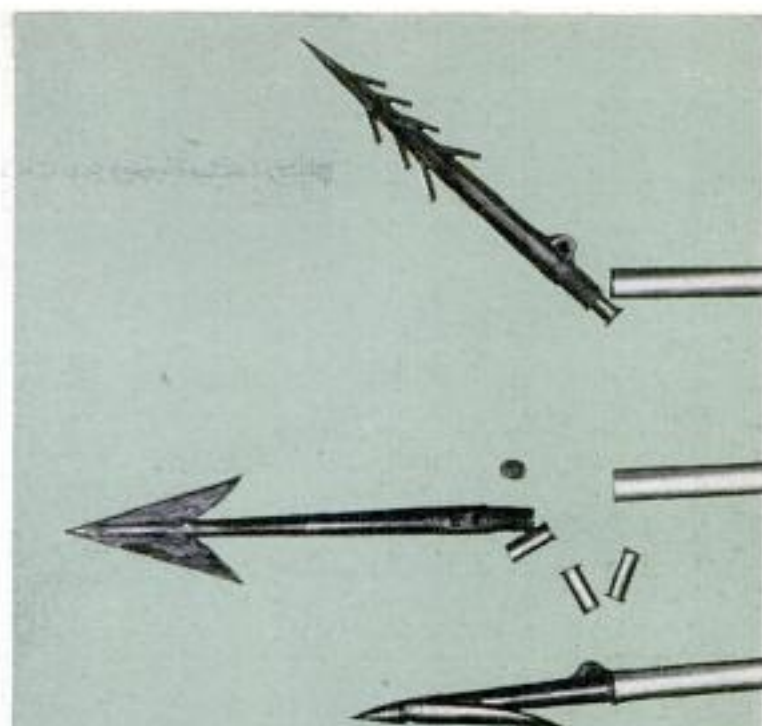
an ordinary gun, however, the firing pin is enclosed in a tube as long as the barrel so it can reach the cartridge at the muzzle of the gun. The hollow aluminum shaft (to which the arrowhead was attached) fits over this tube.

These changeable arrowheads permit the user to vary his shots. For big fish, he can use large heads with large charges; for small fish, smaller ones will do. If he misses the first shot, all he has to do is to slide another "arrow" down into the barrel, cock the hammer, aim and shoot again. (The hollow aluminum shaft with head attached looks so much like an arrow that it is called one by the inventor.) It is not necessary to surface to recock the gun.

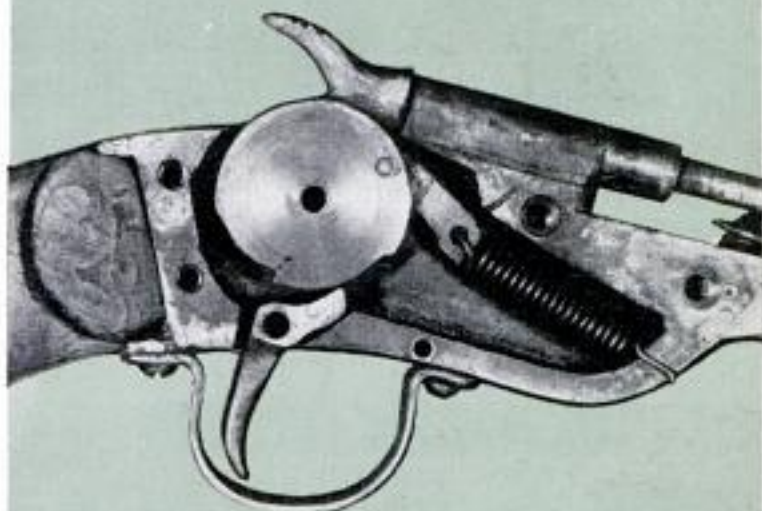
Unlike many harpoon guns, the McDonald design actually likes the water. Some powder guns with the propelling charge in the breech have to use most of their power pushing the water out of the barrel. This gun gets its thrust from the jet action of the charge against the water behind it. It is completely silent and has no kick.

The gun is designed to accommodate cartridges the size of .22-caliber shells. ★ ★ ★

OCTOBER 1954



Changeable heads are shown with the blank cartridges used to fire them. Diver can carry several preloaded arrows with him. Shell fits snugly to keep powder dry



With very few moving parts, the gun is simplicity itself. Hammer hits tube, driving firing pin into shell



Here are the parts shown disassembled. Third long tube from the top is the flared barrel. Most of the gun is made of stainless steel or bronze to minimize corrosion

Detroit Listening Post



By Leo Donovan

DON'T TAKE YOUR EYES off the stage for a moment in the next few months. The show is about to begin and what a performance it promises to be! Never in recent years have there been such great expectations.

Here is the program with the stars named in order of their appearance:

October — Studebaker, Chevrolet and Pontiac.

November—Ford, Buick, Cadillac, Plymouth, Chrysler, DeSoto, Dodge, Imperial, Oldsmobile, Lincoln, Mercury, Rambler and, perhaps, Hudson.

December—none.

January—Packard, Nash.

As you can see, the Thanksgiving turkey will step aside this year. Automobiles have taken over the month of November.

What to Expect

Here are just a few of the reasons why 1955 will be the industry's most exciting announcement season:

There will be at least four different all-new V8 engines, making the V8 just about standard throughout the industry.

There will be a car with long-awaited (in this country, that is) torsion-bar suspension on all four wheels.

There will be an all-new prestige car so carefully put together that each automobile will get two road tests and tune-ups before leaving the factory. When a buyer gets it, it will be in peak condition.

There will be wrap-around windshields on all but two or three cars.

All cars will offer tubeless tires.

Horsepower ratings will zoom. Everybody is waiting for the other fellow to make his claim so he can make a bigger one! It looks as though 150 horsepower will be a low figure, something the "small" cars will offer. There's no doubt the big cars will exceed 250 and approach 300 horsepower in some models.

Sporty station wagons (like the Corvette Nomad) are in the works, but probably won't be announced until spring.

What Does the Public Want?

Despite the horsepower race, the Big Three are aiming for superior styling, lusher exteriors and interiors. Sales experts, reviewing postwar sales of various makes, claim that styling exceeds performance as a means of winning customers.

What the public also wants, unquestionably, are lower prices. Manufacturers are wary about predicting what may happen to 1955 price tags. They'll tell you that production costs have not declined enough to merit any reduction. And anyway, they say, the buyer is getting the best value in history now.

But competition at the retail level is expected to keep prices flexible enough for most bargaining customers. And there is the anticipation that factories will allow dealers enough delivery bonuses and sales prizes to permit more profitable trading.

Apparently, manufacturers have concluded that the public, despite protestations about traffic jams and crowded parking areas, does not want a smaller car. The only dimension that will be smaller in tomorrow's automobiles is over-all height. Cars keep getting lower, but longer. Pontiac, for example, is said to be three inches lower in 1955 than in 1954.

Pontiac Is All New

Pontiac, incidentally, has a completely new car—body, frame and engine. It is the only General Motors car to show declining sales in 1954 and that won't happen again, Pontiac officials state.

It is loaded with styling tricks, including a novel treatment of the characteristic chrome strips that identify it from any angle. Its V8 engine is not, as predicted, a copy of the Olds Rocket. It is all new, all Pontiac and, the company says, all power!

Chevrolet's 1955 models, powered by a new V8 engine (the overhead-valve six will still be available with added horsepower), outshine their swankiest predecessors and resemble in elegance higher-priced models of the current GM family. They are lower, of course, and have a front suspension that Chevrolet is having trouble naming so it won't sound like a competitor's.

Ford and Mercury are not going to slacken their drive for sales supremacy. They have all-new bodies, greatly increased horsepower. Ford is renaming its top line and giving it much more luxury. Mercury will have a new top line. Both will have a startlingly different hardtop.

Chrysler makes its strongest bid since the war and is in a very promising position: (1) Because its dealers are not currently overstocked with 1954 models; and (2) because of its drastic styling changes.

Self-Leveling Combine Works Up, Down and Around Slopes



Idaho Machine and Sheet Metal Works photos

A self-leveling combine in position for downhill work. The driver's seat is reversed for this operation

ALTHOUGH IT MAY LIST like a sinking ship on level ground, a self-leveling combine has proved a most practical aid for farmers in the fertile but hilly Palouse area of northern Idaho and eastern Washington. The mechanical and hydraulic-leveling mechanism is activated by an 88-pound pendulum weight suspended by the driver. It keeps the combine level, even though it may be operating up or down, or on the side of a steep hill. Loss of harvested grain is eliminated and the danger of overturned machines is greatly diminished. The self-leveling combine, which replaces earlier machines that had to be kept on an even keel by hand, was developed through the cooperative efforts of the Idaho Machine and Sheet Metal Works and the International Harvester Co.



The combine can adjust for any contour. Here it is set to work down a hill that slopes to the left



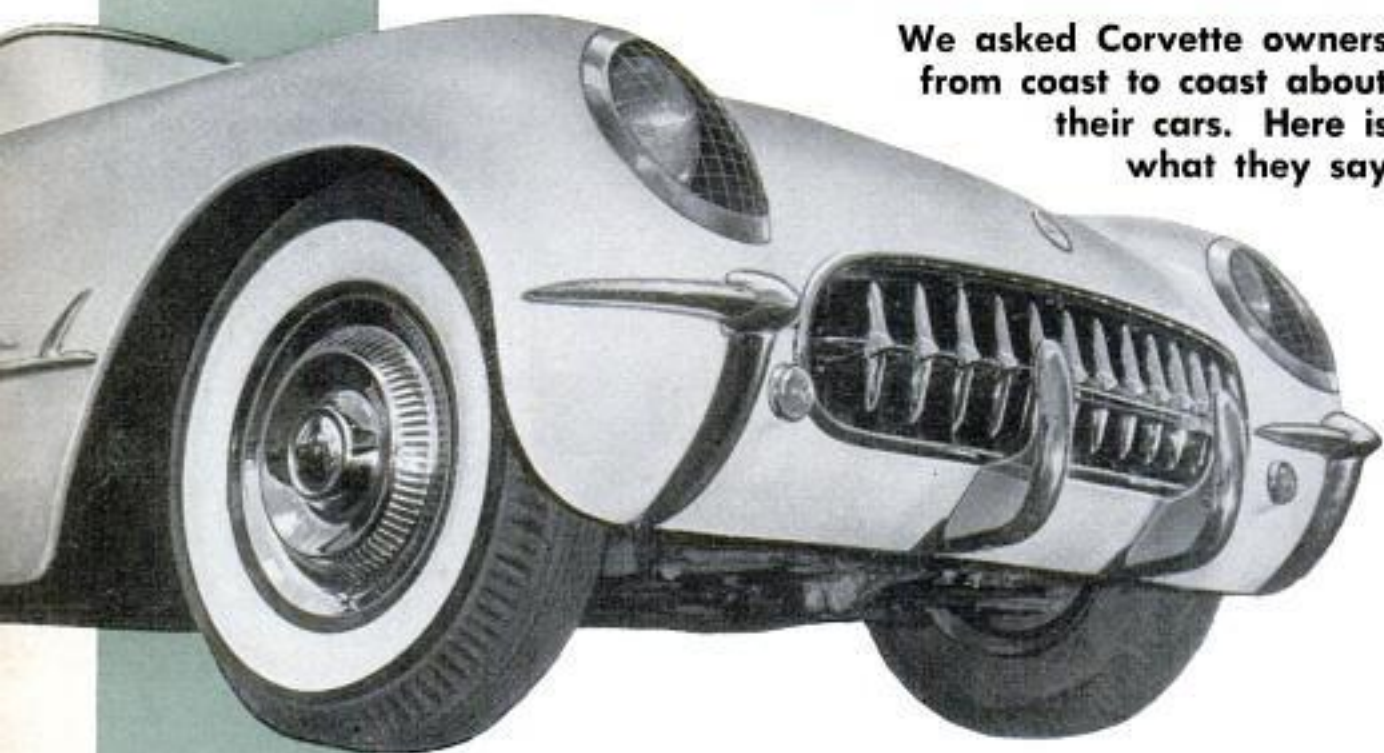
John A. Luedke photo

Ready to work up a side slope, the combine pitches forward. Inset: Actual operation in this position



OWNERS REPORT:

We asked Corvette owners from coast to coast about their cars. Here is what they say



Here are its good points:

"Safest car I have ever driven. Built for comfort on the highway too."

New York coal dealer

"Corners very well. Stays flat. Except for competition use, it leaves nothing to be desired."

Idaho personnel director

"Just good 'fun' to drive."

Illinois merchant

"Best looking sports car I've seen for the money."

California air line Captain

And its weak points:

"Needs serviceable, rainproof top with windows in the doors."

Georgia physician

"Dealers not equipped to repair plastic-body cracks in most cases."

Illinois Sports Announcer

"Rain leaks into door compartments and onto floor. Top too hard to put up. Carburetors don't sync well enough."

California Restaurant Owner



CORVETTE IS A FINE "FUN" CAR BUT IT HAS ITS LIMITATIONS

By Corvette Owners

WHEN OWNERS OF foreign sports cars praise an American car, that's news. And that is exactly what happened. Of the Corvette owners taking part in our survey, 36 percent now own or have owned a foreign sports car. And, amazingly enough, over half of them rated the Corvette better than their foreign cars. Only 22 percent said it was not so good, while 19 percent described it as equal to the foreign product.

"I have driven many foreign sports cars. Over-all, I prefer the Corvette, since I do not race. Corvette beats them all in riding quality and handles just as good," said an Ohio manufacturer's agent.

"If I were racing it might be different, but none of the foreign sports models I've ridden in will equal it for comfort and ease of ride and still give roadability and acceleration."—Idaho dairyman.

"I have owned five sports cars and rate the Corvette more dependable although

not as good to drive."—Illinois executive.

"I have owned foreign sports cars and rate the Corvette better in serviceability, riding comfort and looks. The top fits better too."—Michigan merchant.

"The Corvette is better in traffic, better all around except for top speed."—Kansas oil man.

The consensus seemed to be that, unless the car is to be used in competition events, the Corvette offers more than foreign sports cars.

Body Leaks, Say Owners

But there were complaints about the plastic-bodied sportster. By far the biggest complaint was that the body leaked in the rain. Thirty-five percent of the owners mentioned this as their principal complaint.

"It leaks every time it rains and fills the ash trays with water and soaks the floor mat. You just cannot park it facing uphill during a rainstorm as you'll find a floor full of water."—New York designer.

By Floyd Clymer

THE CORVETTE two-passenger test car had 1406 miles on it when my road test of 465 miles was started. I drove it from Los Angeles to Santa Maria, over the winding roads to Bakersfield, returning across the hot Mojave Desert, where some accel-

eration tests and speed runs were made at Rosamond Dry Lake, and back to Los Angeles over the winding Angeles Crest Highway.

At top speed the speedometer needle hit 114 miles per hour (the speedometer dial goes up to 140, which looks good, but the

(Continued to page 360)

Corvette handles well on corners with skids easy to control. However, steering is too slow, says Floyd Clymer



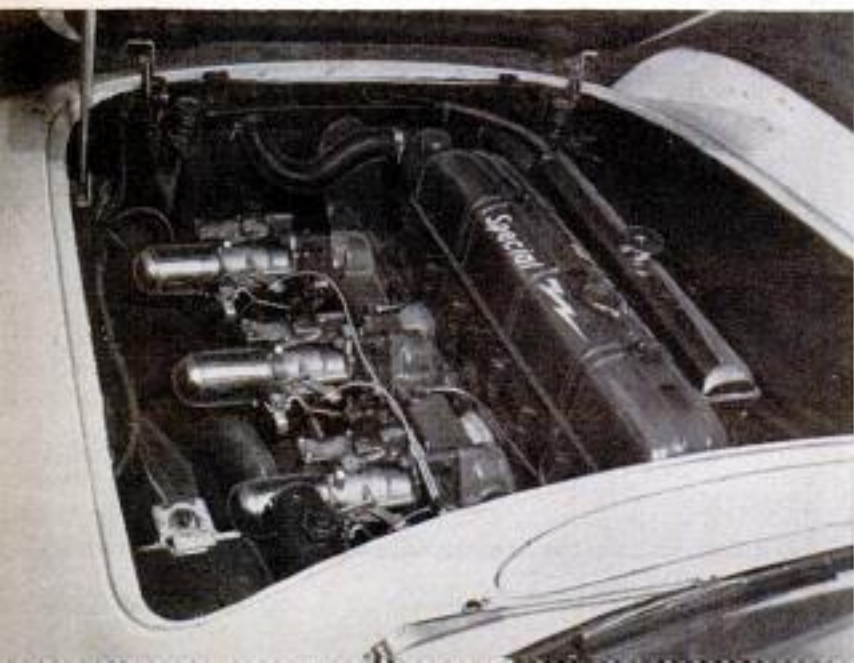


Dash is poorly arranged, say some owners, with tachometer and other dials placed too far to right for easy reading



One of the major complaints was the Corvette's top. It is stored in a well behind the seat and is hard to put up

Three carburetors help boost the Corvette engine's horsepower to 150, giving the light car plenty of performance



"Strictly a dry-weather car. Floor holds four gallons of water. Needs a different top and windows." — Ohio executive.

"Poor visibility in rain. Water pours all over, mainly between windows and the windshield. The top is too hard to put up." — Virginia businessman.

The top was the second most frequent cause for complaint and it is somewhat related to the complaint about leaks.

"Top too hard to put up. Should have a removable plastic top in addition." — California restaurant owner.

"Top fabric not cut to accurate measurement. The first Model-A Ford had a better one." — New York coal dealer.

"Could use a deeper well to store top. Leaks on leading edge of doors. Collects water in door compartments. Accelerator pedal too stiff." — Connecticut sportscaster.

"Roll-up windows should be in doors. Top should be automatic." — Ohio lawyer.

Styling Is Best Liked

Just about all the owners were pleased with the Corvette, praising particularly its low suspension and its ease of handling. But the one feature that appealed to most is styling.

"It is the best-looking sports car I have seen for the money. Well finished inside. The right amount of chrome. No rear-wheel pants." — California airline captain.

"The best-looking car on the road today." — California beauty-salon owner.

"The only car available that compares with foreign cars in styling." — Ohio housewife.

Performance, handling and roadability were close behind styling on the list of best-liked features.

"Very easy to handle, has wonderful pickup, excellent visibility, holds the road beautifully (especially on curves) and is easy to park." — New York buyer.

"Excellent cornering, smooth acceleration, freedom from repairs." — Michigan engineer.

"Corners very well and also sets up a four-wheel drift nicely. It gives ample warning before the rear end breaks loose and is easily corrected." — Idaho personnel director.

"I like the way it drives and holds the road." — Texas dry cleaner.

"Corners well but needs faster steering." — California clerk.



Owners from states shown in color on map give their opinions of the Corvette in the percentages below

Percentages from PM Poll of Corvette Owners

Over-all rating of the Corvette

Excellent	65%
Good	29%
Fair	3%
Poor	3%

Owners rate roadability:

Excellent	79%
Good	19%
Poor	2%

Owners rate handling:

Excellent	82%
Good	16%
Poor	2%

Owners rate structural rigidity:

Excellent	65%
Good	30%
Poor	5%

Average miles per gallon:

In traffic.....	14.9 m.p.g.
On trips.....	17.9 m.p.g.

Acceleration

Excellent	72%
Good	28%
Poor	0%

Average time from 0-60

m.p.h. 11.1 seconds

(Only 35% answered this question)

Average top speed, 109.7 m.p.h.

(Only 48% answered this question)

Owners rate Powerglide:

Excellent	60%
Good	32%
Poor	8%

Owners preferring hand-shift

..... 10%

Owners rate engine:

Excellent	57%
Good	40%
Poor	3%

Prefer some other engine.. 15%

Opinion of plastic body:

Like	97%
Dislike	3%
Would like on family car..	78%
Would not.....	22%
Have had body trouble....	31%
Have not had trouble.....	69%

Owners rate convertible top:

Satisfactory	33%
Not satisfactory.....	67%

Would prefer roll-up windows:

Yes	65%	No	35%
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Would prefer more room:

Yes	26%	No	74%
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Owners rate body styling:

Excellent	98%
Good	2%
Poor	0%

Owners rate brakes:

Excellent	66%
Good	31%
Poor	3%

Owners rate steering:

Excellent	74%
Good	24%
Poor	2%

Owners rate riding comfort:

Excellent	51%
Good	46%
Poor	3%

Have owned foreign sports car:

Yes 34% No 66%

Compare Corvette with foreign sports cars:

(Asked of those who have owned foreign cars)

It's better.....	59%
It's equal.....	19%
It's worse.....	22%

Have another car in addition to Corvette..... 89%

Would buy another Corvette?

Yes	61%
Might	28%
No	1%

Owners rate dealer service:

Excellent	49%
Good	30%
Fair	13%
Poor	8%

Belong to a sports-car club.. 18%

Use Corvette in races or rallies

8%

Best-liked features

Styling	42%
Performance and power....	31%
Handling	19%
Roadability	19%

Most-frequent complaints

Leaks	35%
Top construction.....	18%
Hood catch.....	13%

"Roadability is excellent. Very stable. Handles turns well, has very little float and very little lean. Steering is definitely slow. I am used to driving foreign cars, and I've owned most of them, but in a car with its acceleration, you could get into trouble with the Corvette's slow steering."—Minnesota manufacturer.

Comfort was also high on the list of best-liked features.

"It has all the comfort of a good sedan and the beauty of a sports car."—Georgia real-estate owner.

"The Corvette is the first attempt in giving sports-car features with conventional-car comforts."—Connecticut salesman.

But Is It a Sports Car?

Many owners, especially those who have owned foreign sports cars, were careful to limit the Corvette to something less than a true sports car. It is somewhere between a family car and a sports car, most seem to agree.

"Not a sports car in the true sense of

the word. But it should not be sold to people who do not understand sports cars. It is not like the family car and some might be disappointed if they expect the room, seat comfort, etc."—Illinois merchant.

"This is a real sports car as originally defined in that it can be driven to (not in) the race."—Oklahoma engineer.

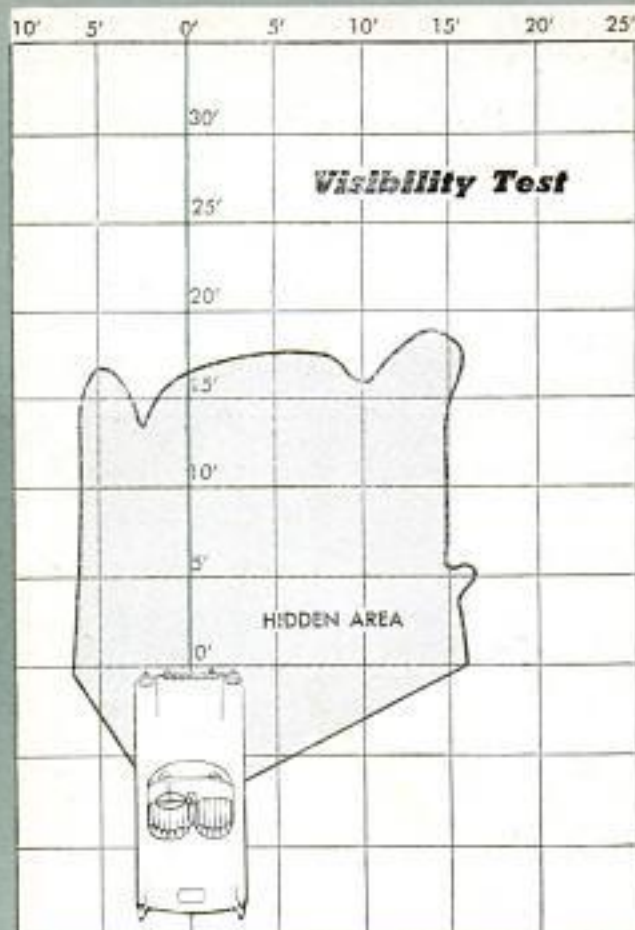
Most owners agree that whether or not it is a true sports car, the Corvette is real fun to drive. As one owner, a Michigan architect, describes it: "I like the feel of driving the Corvette. It gives the pleasure one gets in sailing a boat."

Additional Complaints

"On rough roads, the hood keeps popping up. Hard to get in and out with the top up."—Oregon physician.

It should be mentioned that the hood is hinged at the front so that even though the catch might release, the hood will not fly up as it would if hinged in the rear as on the conventional car.

"Door latches won't stay in position



Acceleration Test

1954 CHEVROLET CORVETTE
with Powerglide

¼ mile from zero	16.4 seconds
½ mile from zero	26.8 seconds
0 to 30 m.p.h.	4.3 seconds
0 to 60 m.p.h.	11.6 seconds
Top speed by speedometer	112-114 m.p.h.
Actual top speed	105 m.p.h.

Economy Test

MILES PER GALLON
Constant-Speed Mileage

At constant 30 m.p.h.	19.4
At constant 50 m.p.h.	17.2
At constant 60 m.p.h.	15.8
At constant 75 m.p.h.	11.7

Cross-Country Mileage

Los Angeles to Santa Maria	18.4
Santa Maria to Mojave Desert	15.3
Mojave to Los Angeles (over winding, mountainous Angeles Crest Highway)	14.2

Premium gasoline used on all tests

Popular Mechanics believes that the best test drivers are the owners themselves. For their opinions, we survey hundreds of them every month and relay this information to you by these Owners Reports. In addition, Floyd Clymer road tests the cars for performance data

and the friction hood latches won't stay tight on rough road."—Texas executive.

"No fender protection. Instrument panel poorly placed. Dealers not equipped to repair cracks in body."—Illinois sportscaster.

"Foot accelerator too rigid. It is hard to give it a little gas."—Arizona rancher.

"Mechanics seem to have difficulty adjusting carburetors."—California broker.

"Exhaust coming out back has tendency to blacken rear of car."—California service-station owner.

"Exhaust fumes bad inside car when the top is up."—Illinois housewife.

"Carburetor air cleaners not adequate."—Arizona banker.

"Screen over headlights makes them inconvenient to clean. Too much engine noise."—New York executive.

"General Motors had no right to deliver cars before their dealers were familiarized with construction of the Corvette. If anything goes wrong they guess and experiment."—California production manager.

"With top and windows up, windshield steams up rapidly even with vent panes partially open."—California real-estate manager.

"Bucket seat good for driver, but should have another bucket seat large enough for two additional passengers."—Idaho lumberman.

How Satisfactory Is Plastic Body?

All but 3 percent of the owners liked the plastic body and 78 percent said they would like to have plastic used on their family cars. There were many owners, however, who had trouble with the plastic body—31 percent of them, in fact.

Here are the comments of a few of those
(Continued to page 356)

Windows, complete with no-draft vents, are stored in trunk. This is the way you have to put them up



POPULAR MECHANICS



General Electric Company photo

Exhaust Flames From Rocket Motor Scatter "Diamond" Trail

You may believe you are seeing diamonds flying through the sky, General Electric scientists report, when you get your first good look at rocket flames flashing by. Photographs of rocket-motor tests show a long string of gem patterns inside each roaring rocket flame, with the fiery ornaments moving into and away from the rocket exhaust as the pressures change inside the motor. As many as eight or nine

of the diamond shapes show up in a single flame. The patterns result, they explain, when shock waves are produced as the hot gases collide with the atmosphere. The long string of diamonds forms as the gases alternately overexpand, then overcontract, as they try to reach equilibrium with the surrounding atmosphere. Once the gases are cooled and slowed sufficiently, the diamonds trail off and disappear.

Five-Ton "Rhino" Floats or Crawls

It may frighten small children, but a steel monster called the "Rhino" is believed by its inventor to be as practical as it is weird. The five-ton vehicle has four hemispherical wheels which float it in water and enable it to cross streams, swamps, mud, desert, mountain passes and roads of any sort. A 110-horsepower engine propels it along the highway at 45 miles per hour. In deep water, it is propelled and steered by a water-jet unit. The machine is designed to combine the advantages of wheeled and endless-track vehicles. On firm ground, it travels on a 4½-inch tread. When the wheels sink into soft terrain, more wheel area is automatically afforded. The 1500-pound front wheels are tilted inward to lower the center of gravity.





Leaf-Raking Machine Built From Scrap Parts

Forty acres of lawn a day are cleared of leaves by a power rake built from scrap parts. Pulled behind a tractor and powered by a motor taken from a broken power mower, it brushes the leaves onto a canvas conveyor that dumps them into a huge bag at the rear. Richard Bourdage, hobby-shop director at the Moose-sponsored Child City, Mooseheart, Ill., built the framework from scrap tin and angle steel. Then he ripped apart his camping tent to get the canvas for the conveyor belt and leaf bag. Scooter wheels and scrap wood furnished the other scrap parts. The only new items in the machine are two cylindrical leaf



brushes connected end to end—Bourdage couldn't find a single commercial brush long enough to fit his homemade outfit.

Landing Net With Scale Built Into Handle Weighs Large or Small Fish



You can weigh fish with a landing net that has a scale built into its handle. The scale weighs up to 30 pounds and can be locked out when it isn't needed. The handle of the net is suspended vertically during weighing.

Find New Way to Make Ice

Refrigerators without compressors, moving parts or chemical refrigerants may result from a recent British discovery. Electricity is passed through a copper junction between a piece of bismuth and a piece of bismuth telluride to create a temperature drop of 50 degrees Fahrenheit. Reversing the flow of electricity results in appreciable heat. The principle behind the system has long been known, but with most metals the temperature change is slight.

Power Cart Rolls to Job

YOU CAN TOTE POWER wherever you want it with a new generating unit mounted on a small cart. The little power plant is no more difficult to move than a child's wagon.

At the job, you can use the power unit as a generator, a pump or an air compressor. With it you can operate electric and air tools, pump out excavations, irrigate gardens, grease farm machinery, spray orchards, livestock and weeds, and perform any number of jobs requiring air, water or electric power.

The portable plant is available in two sizes, one developing six horsepower and the other 2½ horsepower. The basic unit is an air-cooled gasoline engine mounted permanently on the cart. Also on the cart is a mounting which will take the generator, air compressor or water pump. The units are easily interchanged by slipping them in or out of the pin-type mounting. Another item of equipment is an air tank mounted on its own caster wheel. A projection on the tank slips into a socket on the bottom of the cart so the tank can be made a part of the assembled unit. With the air compressor in place, an air hose is run to the tank and the tank filled with compressed air up to a pressure of 150 pounds. This air can be drawn off to operate air tools or spray guns.

All the necessary parts are provided, including the gasoline engine, pump, compressor, generator, air tank and necessary water and air hose.

Gasoline engine runs the air compressor to fill the air tank. Compressed air then operates a spray gun



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Electricity from the generator drives an electric saw

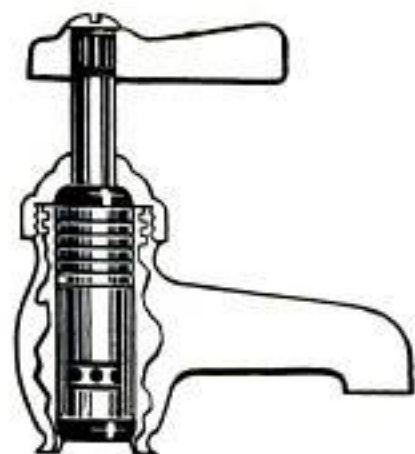
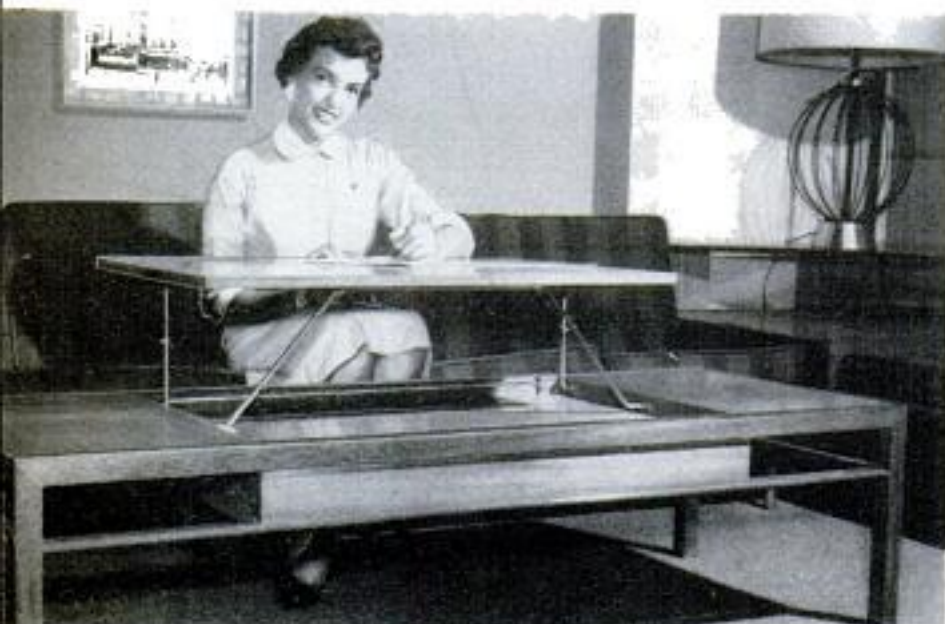


Pump throws 100 gallons of water per minute. Basic equipment includes only one of pumps shown below



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WHAT'S NEW FOR Your Home



FAUCET UNIT rebuilds old faucets quickly and simply, fits practically any type. Replacement unit seals by a different method than compression type, offers finger-tip flow control

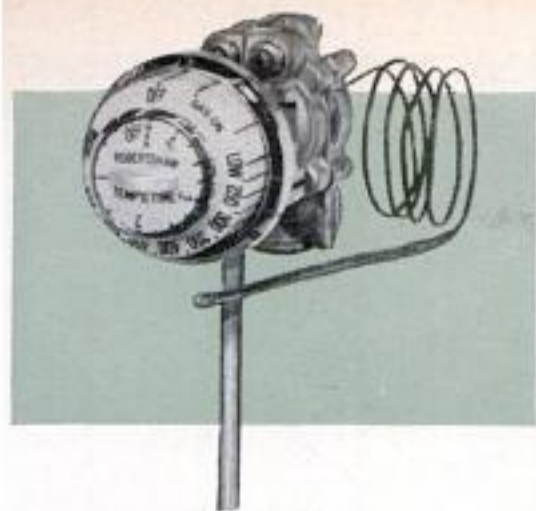
COFFEE TABLE converts to a writing desk. A center section is raised to a 29-inch height on brass supports. The mahogany table-desk was recently exhibited in Chicago

HONE sharpens scissors of any type. The self-adjusting sharpener is built into a plastic handle which rests on a counter top. The blades of the scissors are inserted in the hone and squeezed gently as they are pushed back and forth. Hone adjusts to angle of cutting edge



PHONE SEAT folds into wall when not in use. Single leg locks into position and supports the seat firmly. When you stand up, seat automatically folds back into wall. The complete unit contains a stand for the telephone and an additional ledge. It is fully assembled, is constructed of gummed plywood





TIMERS for gas ranges shut off individual top burners or oven. Units are self-contained and operate with a clockwork mechanism. Burner timer has one-minute settings up to one hour. Oven timer can be set for four hours



MOISTURE CONDITIONER takes moisture out of the air or puts it in, depending upon the humidity. It is capable of removing up to three gallons of water from the air every 24 hours, or putting two gallons into it in a similar period



GAS FURNACE dries clothes in addition to heating the home. Space-saving drier unit is at convenient height, handles 29 pounds of wet wash in 29 minutes



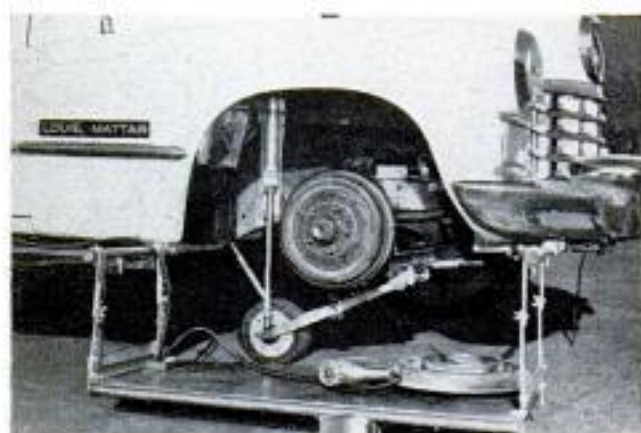
DISAPPEARING SHELF slides under the kitchen counter when not in use as breakfast table or work surface. No legs are needed. Hinged door hides unit



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With the car going 20 m.p.h., Mattar removes the flat tire and puts on spare. Note running board to trunk

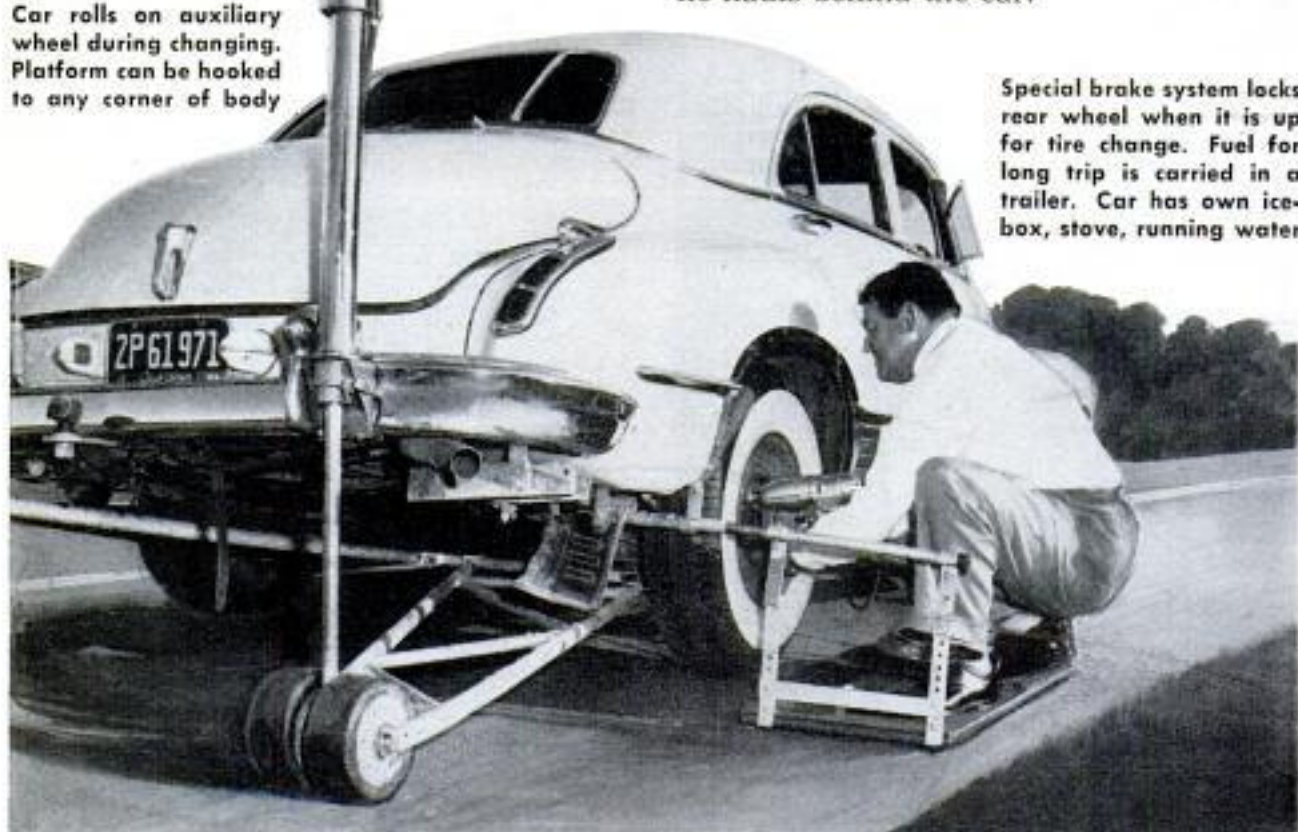


Car rolls on auxiliary wheel during changing. Platform can be hooked to any corner of body

Flats Changed on the Fly

LOUIE MATTAR of San Diego, Calif., doesn't stop to change a flat—he changes it on the fly. Mattar made the tire-changing rig for his proposed 9000-mile nonstop drive from Alaska to Mexico City.

A hydraulic lift raises the wheel as the car rolls along on a small auxiliary wheel. Crouching on a platform beside the wheel, Mattar makes the change. Running boards enable him to get into the trunk to take out the spare tire. He refuels from a trailer he hauls behind the car.



Special brake system locks rear wheel when it is up for tire change. Fuel for long trip is carried in a trailer. Car has own ice-box, stove, running water



Scroll Books Turn "Pages" For Handicapped Persons

Books in scroll form are available to iron-lung patients and other handicapped persons who need only press a finger switch to bring the next page to a comfortable viewing position. An electric motor unwinds the scroll from a lower to an upper magazine when the switch is pressed.

Headrest for Mechanic's Creeper

Mechanics are provided with a raised headrest in a new creeper. The rest can be fixed in any of six positions, is easy to adjust and cannot get out of order. When fully raised, the support extends 7½ inches above the creeper bed.



Moving Surface for Ironing Board

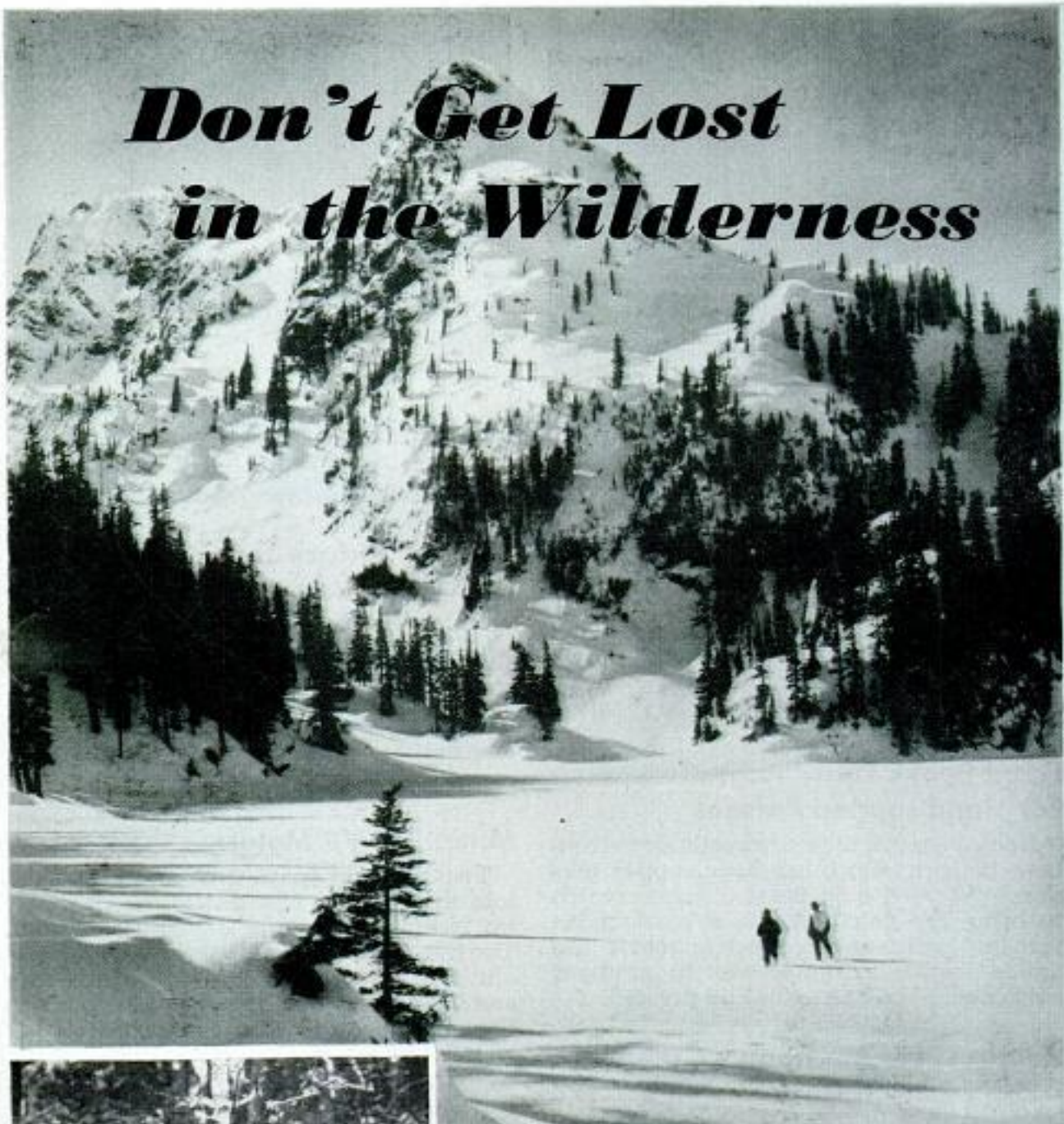
Dutch housewife Mrs. D. Kuys-De Wit has figured out a way to press clothes without lifting her iron. She's constructed an ironing board with a moving surface. The garment is pinned to the board and a set of wheels enables the piece of cloth to be rolled under the iron.

Miniature V8 Motor

Two years of spare time and \$125 went into the building of a miniature V8 motor by Norman Seymour of Whittier, Calif. The five-cubic-inch motor reaches 7000 revolutions per minute, has a 15/16-inch bore and a 7/8-inch stroke. It weighs 13½ pounds. Seymour made most of the parts.



Don't Get Lost in the Wilderness



Familiar landmark in summer, a lake loses identity as a snow field in winter. Left, break branches to mark your way back

By George W. Martin

I'M LOST! The thought brings sweat to the forehead and knots to the stomach. Reason often vanishes. Hysteria takes over. Don't let it happen to you.

Even experts can get lost in the woods. The true expert remembers that his biggest worry is not weather, not food or water, not anything but himself. He knows he must not lose control of his senses. To do so may be fatal.

One camper failed to return to camp. At first his friends were not worried because he was an experienced hunter. But by 10 o'clock the next morning they were concerned and sent out a search party. Twenty-four hours later, the man was found wandering aimlessly in the woods no

more than two miles from camp. He had thrown away his gun and jacket the first afternoon when he realized he was lost because they slowed him down. He had frantically "bulldozed" through the thickest brush. His clothes were torn. Deep scratches covered his body. His cap was gone and his hair was matted with twigs. He did not remember resting or drinking at the many streams he had crossed during his 36 hours of hysteria. Consumed with fear, he was sure he would never find his way out. Yet he had been traveling in circles only a mile or two from camp.

Some teen-agers stopped to pick berries in a clearing near the road. When they were ready to leave, a 14-year-old girl was missing. They searched the area, calling her name, but could not find her. Three hours later and ten miles away, she stumbled into a fishermen's camp, hysterical and utterly exhausted. It was unbelievable that a girl with no experience in the woods could have gone so far in such rough country so quickly. Fear had driven her at almost superhuman speed, taxing her strength to its limit. Had she not accidentally wandered into the fishermen's camp, she undoubtedly would have collapsed from exhaustion.

Few of us who have not experienced the sickening fear of being lost have any idea of how we would act in such a situation. One thing, however, that seems common to all is a strange desire to discard all surplus clothing and equipment and hurry, hurry, hurry! There develops a dulling of the senses and a high nervous tension that prevents rational thinking. If you ever go hiking or camping, prepare yourself right now for the possibility of being lost. You don't have to be in a strange area to have



If you get lost, establish a well-marked base camp; then climb hill or small tree to look for landmarks



Mountaineers mark return route with wands—cloth strips tied to sticks. Below, a sudden snowstorm on mountain cuts vision but wands lead party back





Fog rolls in over the peaks. Soon landmarks will be hidden. Campers should be prepared for such conditions

If there are children in the party, it is wise to mark trail plainly by tying cloth to low branches



it happen. A sudden storm, fog, or darkness may blot out recognition of familiar landmarks anywhere you might be.

Three men, in an area they had hunted for several years, made camp by a stream in early afternoon. About an hour before dark, they went up the ridge to look for animal tracks. Twilight began to fall so they started back. After wandering around in the darkness for an hour without finding their camp, they settled for the night in a small opening. They noticed a place where something had been digging by the stream and, being aware that there were bears around, they presumed a bear had done it. All night they half-dozed by a campfire. The next morning they were surprised to see their camp not 100 yards away behind a clump of trees. Their sleeping bags were rolled out ready for use as they had left them. The hole by the creek had been made by one of them the day before to simplify drawing water from the stream.

If you should become lost, there are a few rules that may save your life. Parents should teach these rules to their children as soon as they are able to understand. A most important rule is: If you don't know which way to go, stay where you are so you can be found by your companions.

So that you won't get lost, here are some suggestions to follow:

1. Study maps of the area, noticing directions, rivers, streams and ridges.
2. If possible, discuss the area with someone who has been there.
3. Carry a watch, compass and map.
4. Orient the map by using your compass.



When you are lost, make camp, gather firewood and get reasonably comfortable before darkness closes in

5. If not sure of your location, do not travel at night or in fog unless absolutely necessary.

6. Do not try to go too fast, nor too far to return by daylight.

7. Take time to note characteristics of the area. Look carefully as you go along. Note landmarks by looking back at them—the way you will see them when you return.

8. Take plenty of clothing (preferably some wool), a first-aid kit, flashlight and matches in a waterproof case so you can be

comfortable if delayed.

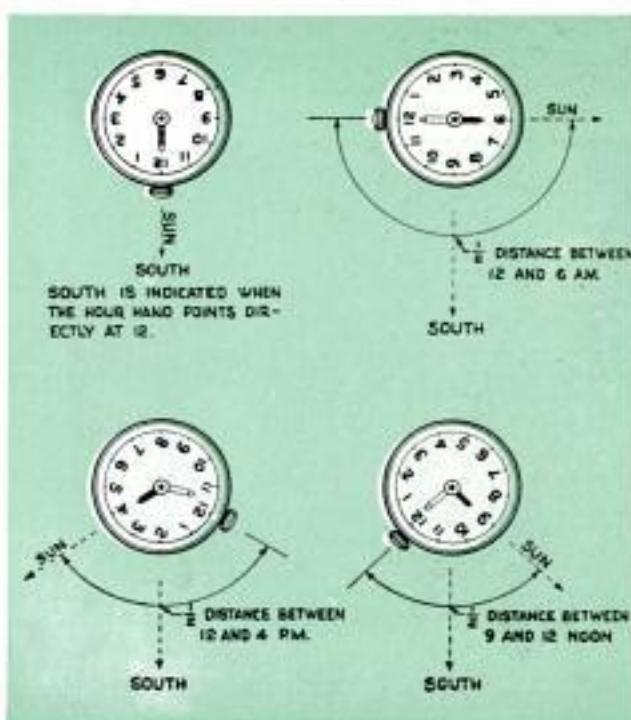
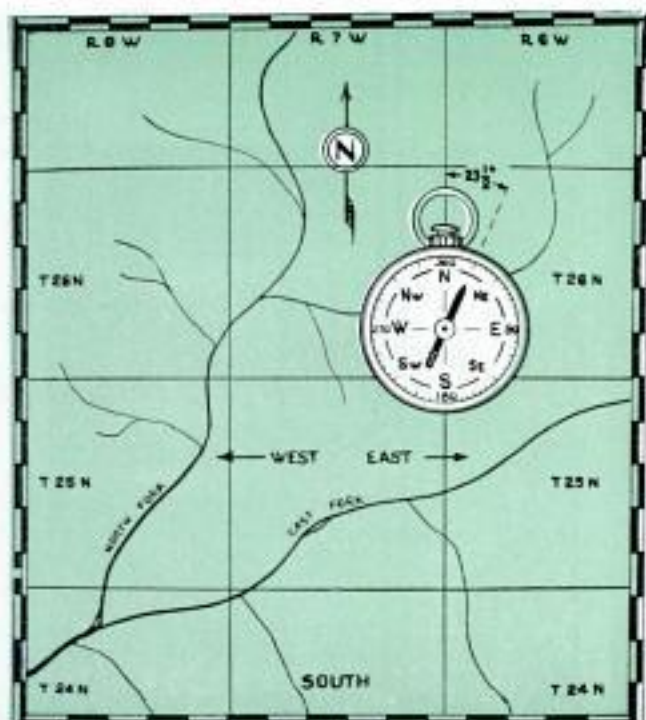
9. Learn the distress signals. Three successive calls, shots or whistles are standard distress alarms. At least a minute should elapse before repeating them. Use them only in an emergency.

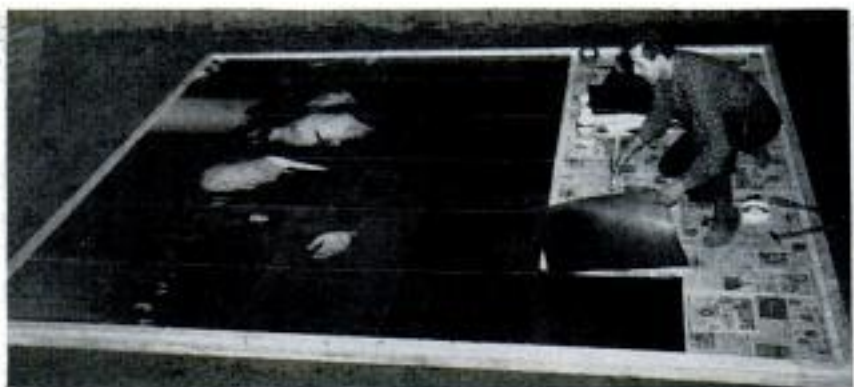
Even taking these precautions, you may become lost. Remember these rules and save your life:

1. Do not lose your head. Sit down and rest. Think over what you will do. Don't

(Continued to page 354)

Magnetic north is near Greenland. Compass points east of true north. Right, watch can be used as a compass





Display "Biggest Photo in Turkey"

Reportedly the largest photograph ever displayed in Turkey was recently exhibited above the entrance of the United States Information Center in Istanbul. The photo shows President Eisenhower with Celal Bayar, president of Turkey. Thirty-six sheets of 24-by-20-inch enlarging paper were used to make the 12-by-11-foot enlargement. Horizontal exposure was made by a 4-by-5-inch negative through an enlarger about 18 feet from the enlarging paper. The image was enlarged about 950 times. Exposure time was 200 seconds.

Coconut Water Introduced Into Bloodstream Replaces Body Fluids

Coconut water may be used in emergencies to replace body fluids, according to a report by Dr. Ben Eiseman of Denver. Preliminary studies carried out in Bangkok, Thailand, and in St. Louis suggest that physicians in remote areas and under emergency military conditions could use

the water from unripe coconuts as a substitute intravenous solution. Twenty-one persons have received a total of 26 intravenous infusions of coconut water without serious reactions. Main ingredients are potassium, chloride, phosphate, sugars, magnesium, calcium and proteins.

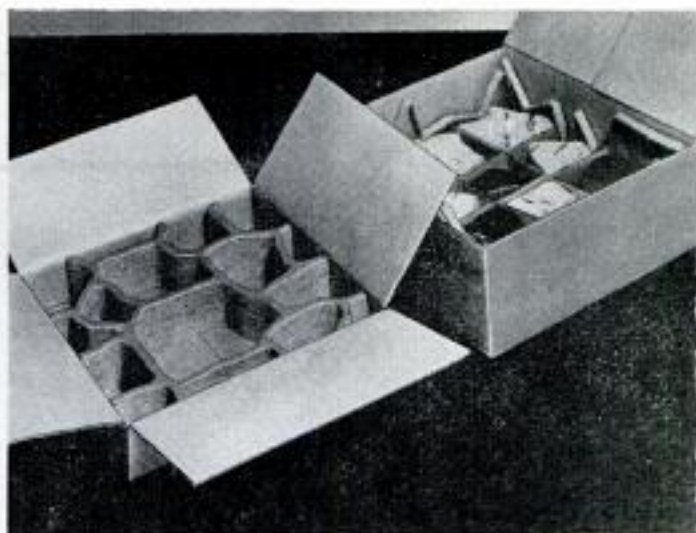
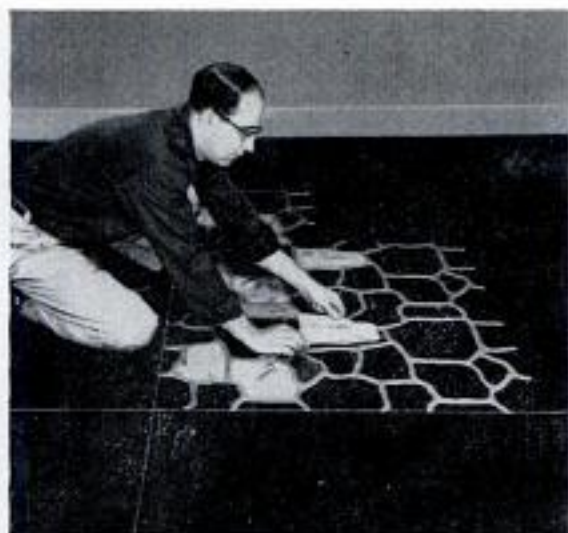
Pan American Adds Staterooms for Trans-Atlantic Air Travelers

Luxurious private staterooms are now available on trans-Atlantic flights of Pan American World Airways. They offer privacy to celebrities, businessmen who use travel time for conferences and families flying with children. On the forward

bulkhead of each stateroom is a washstand, a completely stocked toilet-article cabinet and a side stand with a bookshelf. In addition to reclining lounge chairs, it has a private clothes closet and space for storage of overnight baggage.

Pan American World Airways photos



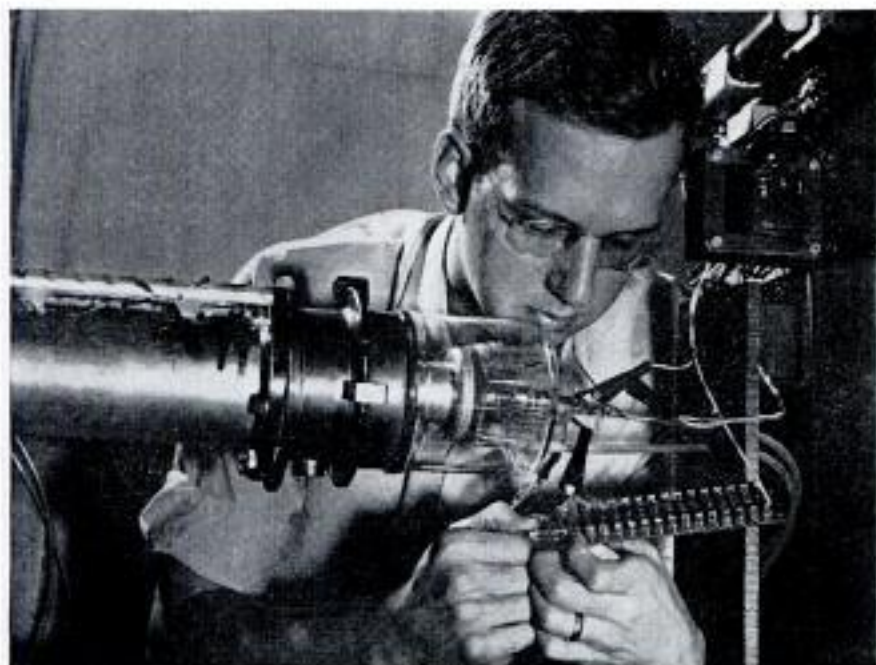


Grids are laid in place, then tiles fitted in. Tiles and grids in single carton will cover 54 square feet

Flagstone-Shaped Asphalt Tiles Fit Between "Mortar" Pattern

Asphalt tiles that look and are shaped like flagstones offer a new way to floor your den or game room. The tiles are fitted into 18-inch-square grids like pieces in a jigsaw puzzle. The grids are cut out of plain gray asphalt tile and resemble mortar. After each row of grids is cemented to the floor, the tiles are fitted into the proper openings; they interlock on all sides of the grids with spaces in the adjoining frameworks. Although more difficult to install than conventional tiles, the simulated flagstones can be laid by the average homeowner. No special tools are needed. One design, combining different sizes of plain, straight grain and swirl-marbleized units, is manufactured in three color schemes. The maker says this is the first asphalt tile made in anything but block shapes.

Completed tile floor lends "outdoor look" to room



Electron Shooters In "Junior" Sizes

Electron accelerators in "junior" sizes are being developed for cancer therapy and inspection of industrial products. The small accelerators will be patterned after the billion-volt, 200-foot-long linear accelerator at Stanford University. Under development is a 6,000,000-volt, six-foot accelerator for medical treatment. Other sizes will follow. The machines "shoot" electrons in a straight line through a copper tube at almost the speed of light.



Two swamp buggies churn away from the starting line at the beginning of the grind around the mile of mud

THEY CALL IT Swamp Buggy Day, but a better name might be "Carnival of Mud"—for plain, dirty, sticky Everglades gumbo is one of the main ingredients in the one-day celebration held annually at the small town of Naples, on the west coast of Florida.

Founded in 1949, the event is dedicated to the pioneers who traversed some of the soggiest terrain man has ever conquered and settled the Everglades of South Florida.

The special day centers around a strange vehicle called the swamp buggy. Born in the days of the Model T, this souped-up hot rod of the 'Glades now comes in a wide variety of sizes, shapes and power plants. It is essentially a light, high, four-wheeled vehicle with a short chassis, airplane tires, chains and often a four-wheel drive. It's capable of traversing the most difficult terrain.

The swamp buggy was developed as a

Some racers, like the "Betty J," never really get started. A bulldozer is then called in to clear the track





Swamp-Buggy Steeplechase

By Max Hunn



Clean swamp buggies parade before the race begins. Standard equipment on the varied vehicles are airplane tires and chains



means of moving through the trackless and usually sodden Everglades where ordinary vehicles quickly bog down. The machine antedates the swamp-buggy celebration by many years. Ed Frank, an Everglades expert, is generally credited with developing the first swamp buggy at Venus, Fla., from the remains of a sturdy Model-T Ford. Before, travel through the liquid 'Glades was either by ox team, on foot or in boats like the cypress-log dugouts of the Seminole Indians.

Frank built his first swamp buggy for hunting expeditions into the more remote regions of the 'Glades. George Espenlaub, one of his brothers-in-law, helped with the first buggy.

The 1926 runabout was a far cry from the souped-up vehicles which now are virtually standard equipment for hunting parties in the 'Glades. Frank's first Model-T buggy was equipped with truck tires and cleated chains. It was an advance in 'Glades transportation, but not perfect. As the early experimenters said, "We were stuck most of the time, and spent as much

time pushing ourselves out of mudholes as we did driving."

But the idea had merit and improvements were soon forthcoming. George Espenlaub, finding the cleats were doing little good, took casings of larger tires and slipped them over the regular Model-T tires. He then cut sections out of the outside casings and thus had a lug-type tire similar to those found today on modern tractors. It was a definite improvement in traction.

The power plant proved to be the next problem. The Model T didn't have the power to churn through the suctionlike cypress swamps and the sodden Everglades, so the inventors sought a more powerful engine. They adapted a Model-A Ford engine to their purposes and found the power they needed. Many of the swamp buggies today are still driven by souped-up Model-A engines.

As the years passed, more and more changes were made in the basic swamp-buggy design. The chassis were shortened and the bodies stripped of all unnecessary



"Redbug," a revamped tractor, is geared for more speed but retains original power. Its tires need no chains

materials to achieve maximum lightness. Special transmissions were installed, and winches were mounted to enable the buggy to pull itself out with the aid of a tree if mired. Then, shortly before the end of World War II, B-26 bomber tires were substituted for the truck and tractor tires which had become standard equipment. The tremendous surface of the airplane tires made it possible to cross soft mud flats which previously had meant trouble, hard work and possibly complete bogging.

Almost simultaneous with the adoption of the airplane-bomber tires as standard

equipment, four-wheel-drive transmissions—many from surplus army vehicles—were installed, further increasing the traction power of the buggies.

Today, virtually every swamp buggy worthy of the name boasts of airplane tires on all four wheels, a souped-up power plant and usually chains. Short of tackling deep rivers, the buggies will get you there and bring you back—a boon to the hunters who like to prowl the 'Glades.

Stuart Rabb, former newspaper editor in Naples, is generally credited with suggesting the idea of the Swamp Buggy Day.

Man on rear of swamp buggy aids traction by shifting his weight around. Spinning tires send mud flying





Like the "Betty J," this buggy mired at the start of the race. A bulldozer ready for such duty pulls it out

He made the suggestion of a race between buggies while taking pictures of Ed Frank departing on his buggy for a hunting trip.

Today, the highlight of Swamp Buggy Day is a race over a mile track that would make the veteran race driver shiver. There's water and there's mud, and there's more mud. The site is the same as it was for the original race—a cypress swamp near Naples. Of course, the sponsors aren't satisfied with what nature has provided in the way of soggy terrain, and add a few delicate touches—bulldozer style—before race day to make certain that the track is sufficiently gooey. Obliging enough they also provide bulldozers to haul out the many buggies that bog down.

The race is run—if that term can be correctly applied to slipping, sliding, wheel-spinning through the mud—over an oval course a mile in length. Four buggies usually go to the post in a heat but, with normal track conditions, it is a rarity to have all four starters get away.

At the sound of the starter's gun, the engines roar, wheels spin and mud flies in all directions, for steering a straight course while churning up the gumbo is no mean feat. Snorting, grunting and chugging, the buggies move along, some gaining speed, others just plodding, but one and all striving not to bog down.

In addition to the natural mud and the manmade mud, the race has an additional

A foot race through the muck is part of the day's events. Even side-line photographers get their share of mud





Mired swamp buggies keep the rescue bulldozer busy. Axles of these racers are submerged in sticky goo



Chains help traction and are widely used on swamp buggies. Putting them on airplane tires is easy task

hazard in the ruling that each driver must stop his buggy at the water hole, turn off the engine, and dismount and run completely around the parked buggy before starting up again and heading for the finish line a short distance away. The overheated engines often refuse to start again, and more than one leading driver has lost the race because his motor balked at a second start. The spectacle of the driver churning his way through the mud and water around his parked buggy provides laughs for the spectators if not for the drivers. Any driver winning a race earns his prize. Both spectators and drivers will testify to that.

Gradually the celebration has been expanded into an all-day affair. Swamp buggies come from all over the state to compete. Now the celebration starts with a parade of swamp buggies, floats and bands down the main street of Naples. ★ ★ ★

Two swamp buggies roar around the final turn and into the home stretch. The annual race is staged in heats





Small Meter Prints Postage And Moistens Envelopes

No larger than a desk telephone, a handy office meter imprints postage on envelopes or on gummed tape for use on parcel-post packages. The meter, which accommodates envelopes of any size or shape, also moistens the flaps for faster sealing. A rotating wheel selects postage. Two dials indicate the amount of postage used and the amount still available.

Dry Ice Aids Missile Study

Supersonic-missile models made from Dry Ice are tested in wind tunnels at the Naval Ordnance Laboratory in Silver Spring, Md. The frozen models evaporate in the same way that a missile would burn as it speeded through the earth's upper atmosphere.

Foot-Long Pedal

Attached in a few minutes, a gasoline-pedal extender is especially helpful for women drivers. The whole foot rests on the elongated pedal. It can be adjusted to various angles easily.



Ambulance Radio Transmitter Turns Traffic Lights to Red

Traffic lights change from green to red as an ambulance fitted with a special radio transmitter nears intersections. The transmitter, mounted on the window beside the driver, sends a beam to a midget receiver mounted on an intersection signal. The receiver cuts into the signal timing and turns all lights red for five seconds, long enough for the ambulance to speed through. The system, developed by North American Aviation, was shown recently in Los Angeles.

Pulverizer for Rotary Mower Ends Need for Raking Leaves

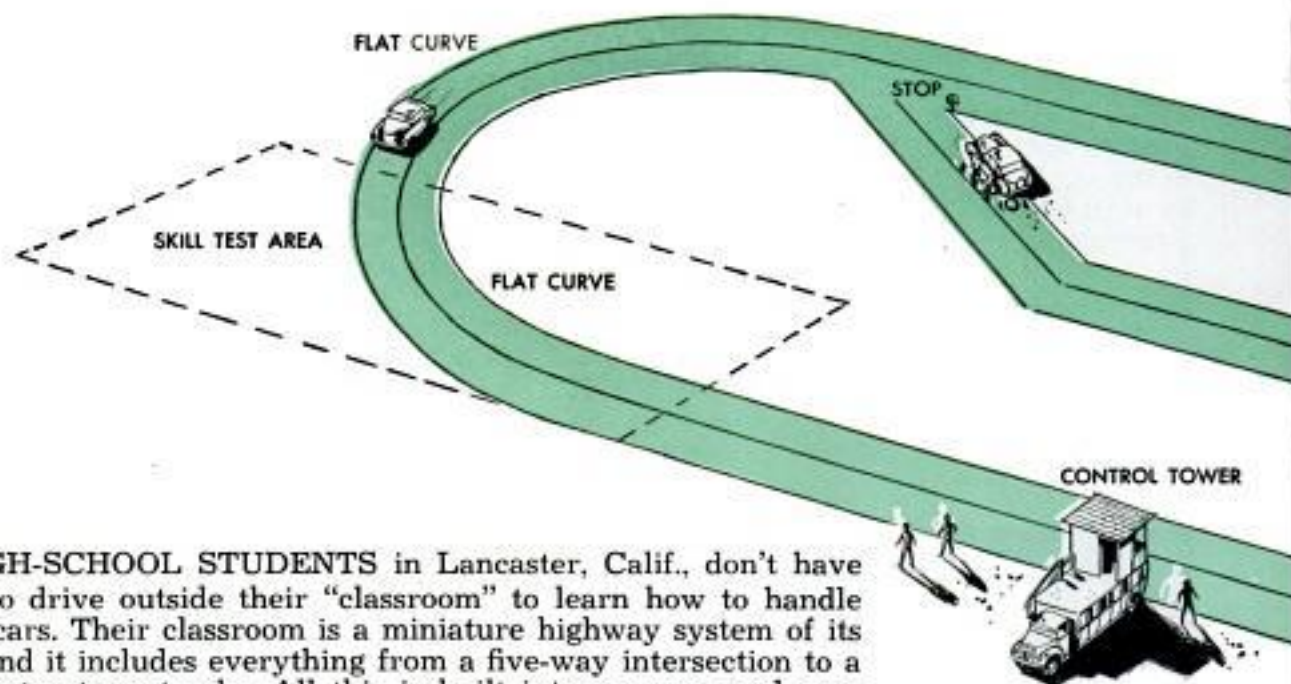
Easily attached to a gasoline rotary mower, a mulcher pulverizes leaves, making it unnecessary to rake, haul and burn them. The ring-shaped attachment, which is made of heavy steel and will last the life of the mower, fits inside the mower. The vacuum-lift action of the mower pulls leaves into the path of the whirling blade and a flange holds leaves inside the steel ring until they are chopped fine enough to be blown out through small perforations. The leaf particles quickly decompose, adding turf-building humus and minerals to the lawn.





Students learn that reaction time permits car to travel many feet before driver can start to apply brakes

DRIVING RANGE FOR BEGINNERS



HIGH-SCHOOL STUDENTS in Lancaster, Calif., don't have to drive outside their "classroom" to learn how to handle their cars. Their classroom is a miniature highway system of its own and it includes everything from a five-way intersection to a set of street-car tracks. All this is built into an area no larger than two football fields.

The roads range from a narrow dead-end street, used for testing turn-around ability, to a broad superhighway. There are stop signs galore, a railroad crossing with signals that operate and a variety of curves built into the quarter-mile roadway that completely encircles the area. Inside the oval there are several streets with six different types of intersections. In addition, there is a large paved area for special skill tests, including some portable curbing for parking problems.

Instructors sit in a control tower and communicate with "law breaking" drivers by loudspeaker. Once proficient on the course, the students take final exams on regular city streets. ★ ★ ★

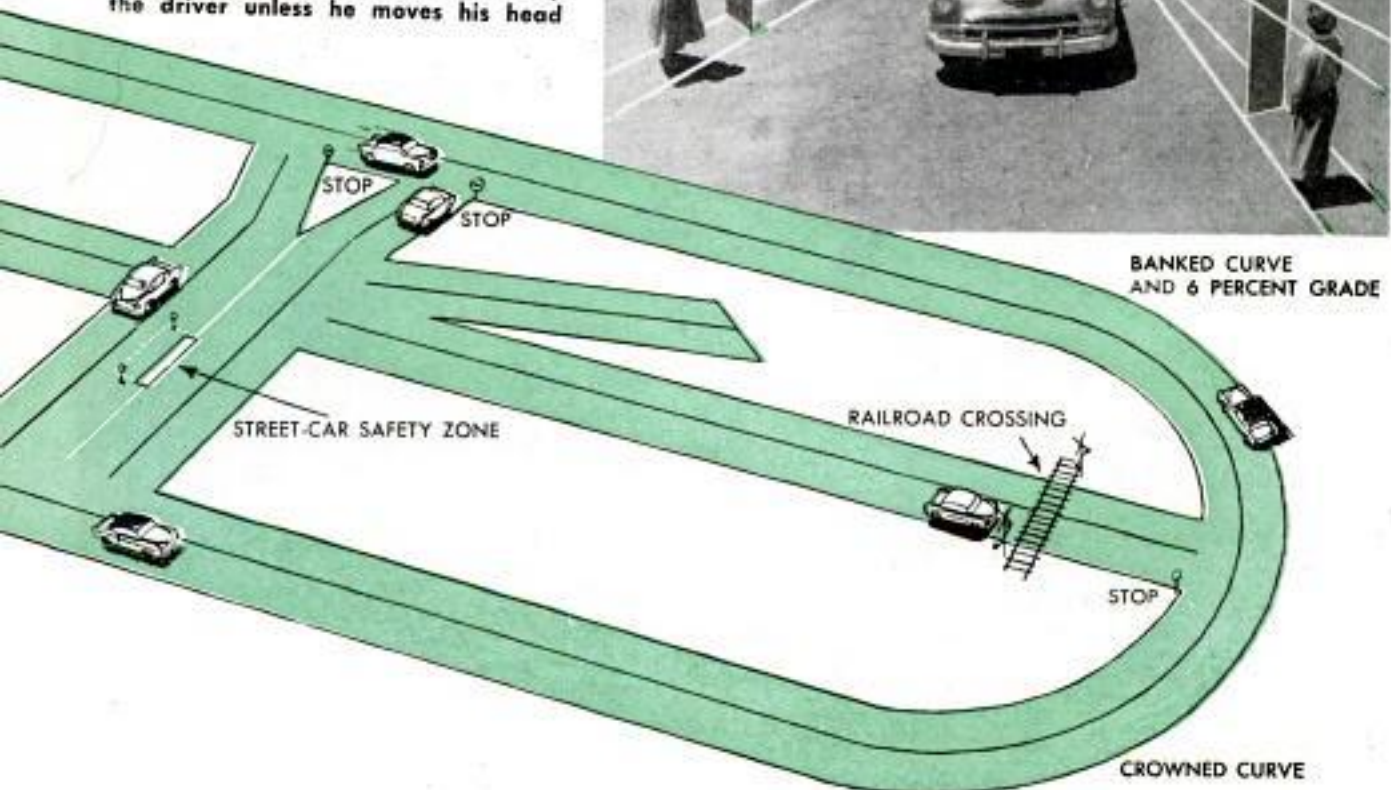
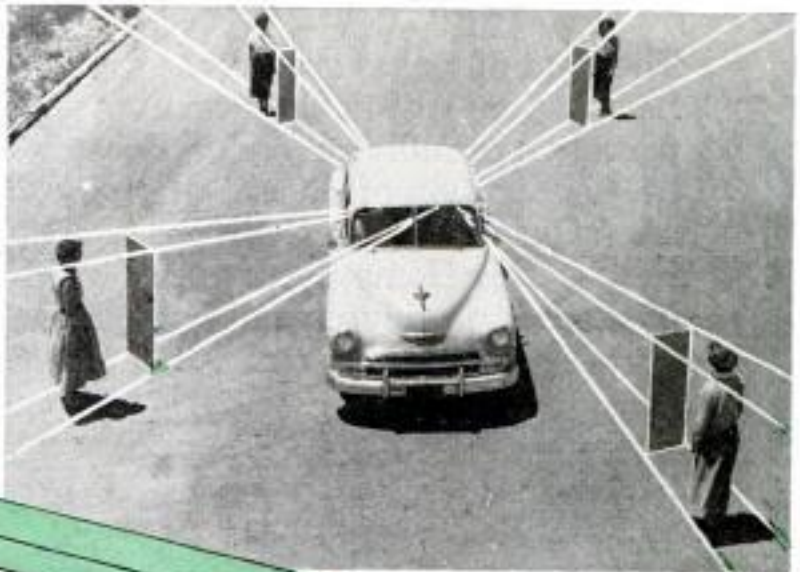


Detonator on front bumper fires chalk on road when signal to stop is given. It fires a second mark when brakes are applied, showing reaction-time travel



Top right, from the control tower the instructors observe the entire test area and give out "traffic tickets" to violators through a loudspeaker system

Girls demonstrate blind spots in the car. None of these girls can be seen by the driver unless he moves his head



BANKED CURVE AND 6 PERCENT GRADE

CROWNED CURVE

Drawing of the high-school driving range shows how maximum use has been made of the area. Included in the layout are several types of curves, as well as a variety of intersections, stop signs, a railroad cross-

ing and other highway hazards. While the oval may look like a race track, it is not used for that purpose. Skill-test area has room for practicing parking, tire changing and maintenance inspections

Presenting:

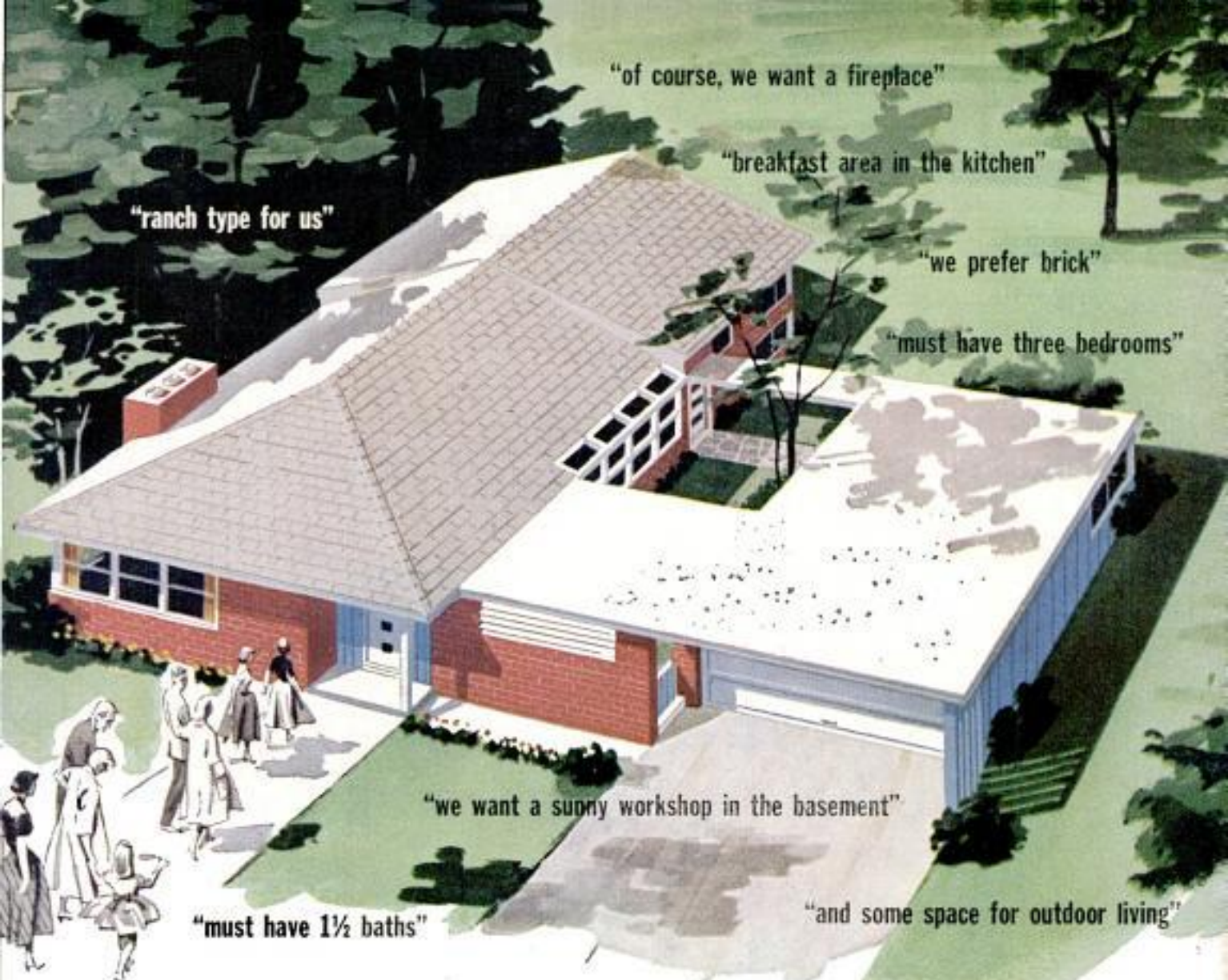
POPULAR MECHANICS ANNUAL



HOME SECTION

The next 50 pages are devoted to your home—whether it be new, old or still in the dream stage. In the following color pages we proudly present a house which was designed with the cooperation of several thousand *PM* readers. Our editors and artists have traveled from coast to coast gathering material for this Home Section and we think it is representative of the best in houses and home ideas being produced today.





"of course, we want a fireplace"

"breakfast area in the kitchen"

"ranch type for us"

"we prefer brick"

"must have three bedrooms"

"we want a sunny workshop in the basement"

"must have 1½ baths"

"and some space for outdoor living"

"What kind of a home do you want?" we asked 5500 PM readers. From their responses, Rudolph A. Matern, noted architect, has designed

The House You Asked For

By Wayne Whittaker

OUT OF THE DREAMS of our readers came this house. Dreams that were written down on paper, totaled up into neat percentage tables and handed to a noted architect with the commission:

"Translate this dream into a real home. A three-bedroom home, in the medium-price bracket, with space for outdoor living, an ample workshop for the man in the family; a one-story ranch house with a bit of that architectural genius that lifts it out of the ranks of the ordinary."

It began with a questionnaire asking 5500 readers of *Popular Mechanics* in every state and the District of Columbia just what they want in a home. Brick house or frame? Basement or none? Fireplace? Air conditioning? And how much would they spend? This must be no impractical dream

house; the pocketbook must rule the plan.

So enthusiastic was the response that 3561 replies from our subscribers were in our hands within a brief few weeks. Many more came too late to be included in the survey figures.

The figures, expressed in preferences and added up into percentages—78.7 percent wanted a one-story house, 13.7 preferred two stories and 7.6 percent specified the split-level, and so on—were assembled for us by an independent consultant and

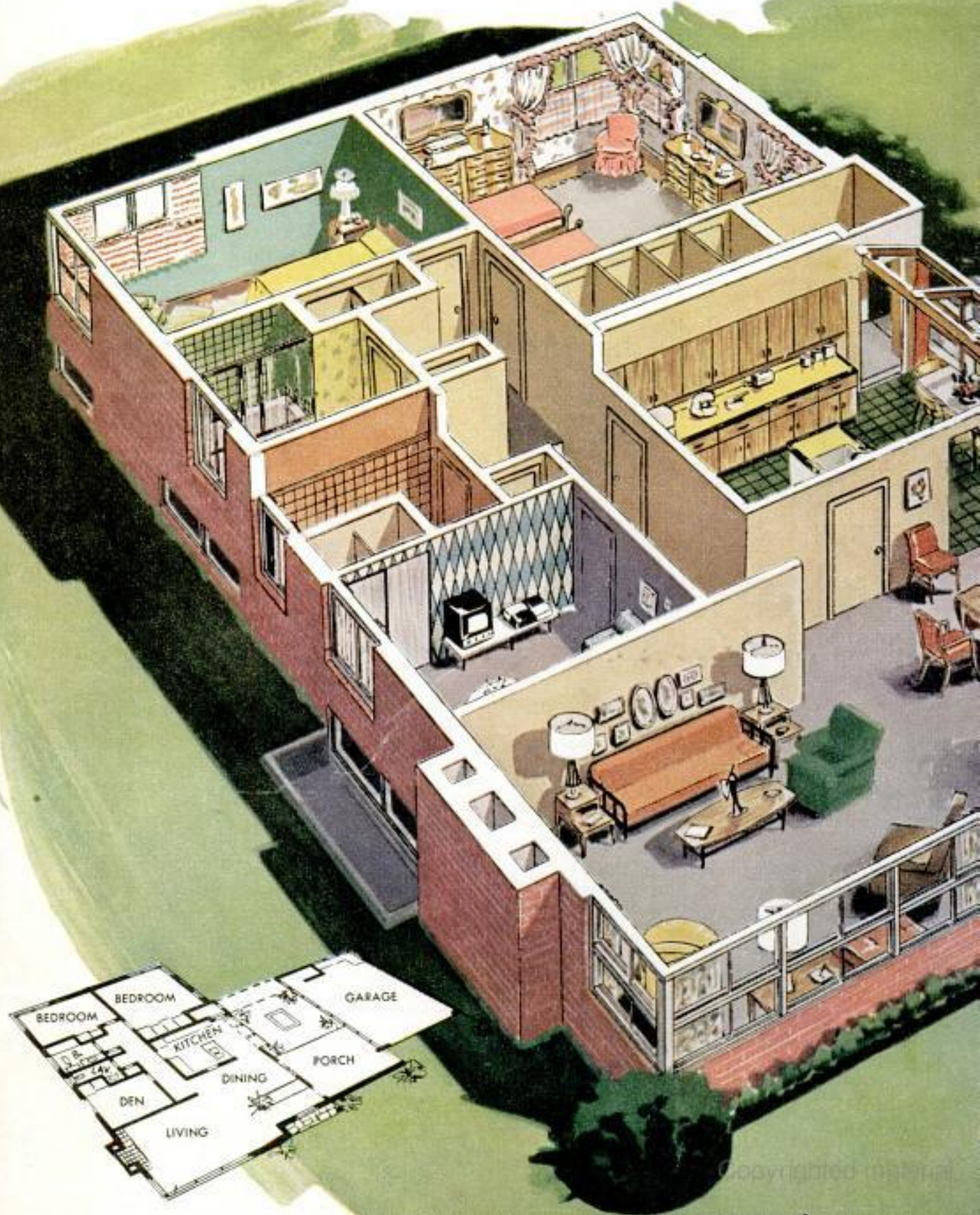
Blueprints for this house are available. Write: Plans Department *Popular Mechanics Magazine*, 200 East Ontario Street, Chicago 11, Illinois.

put to the architect in the form of a problem: "Here's what the majority of *Popular Mechanics* readers—let's say the majority of American families—prefer in a new home. Translate these desires for us into a plan for modern living."

The architect chosen was Rudolph A. Matern, A.I.A., of Jamaica, Long Island, N. Y. One of the leading designers of ranch-

type houses in the world, he was frankly fascinated by the assignment. He was not to work out a solution merely for the wants of a single home builder, but satisfy the demands of a vast majority yet with no loss of style and individuality.

Out of the dictates of the readers and

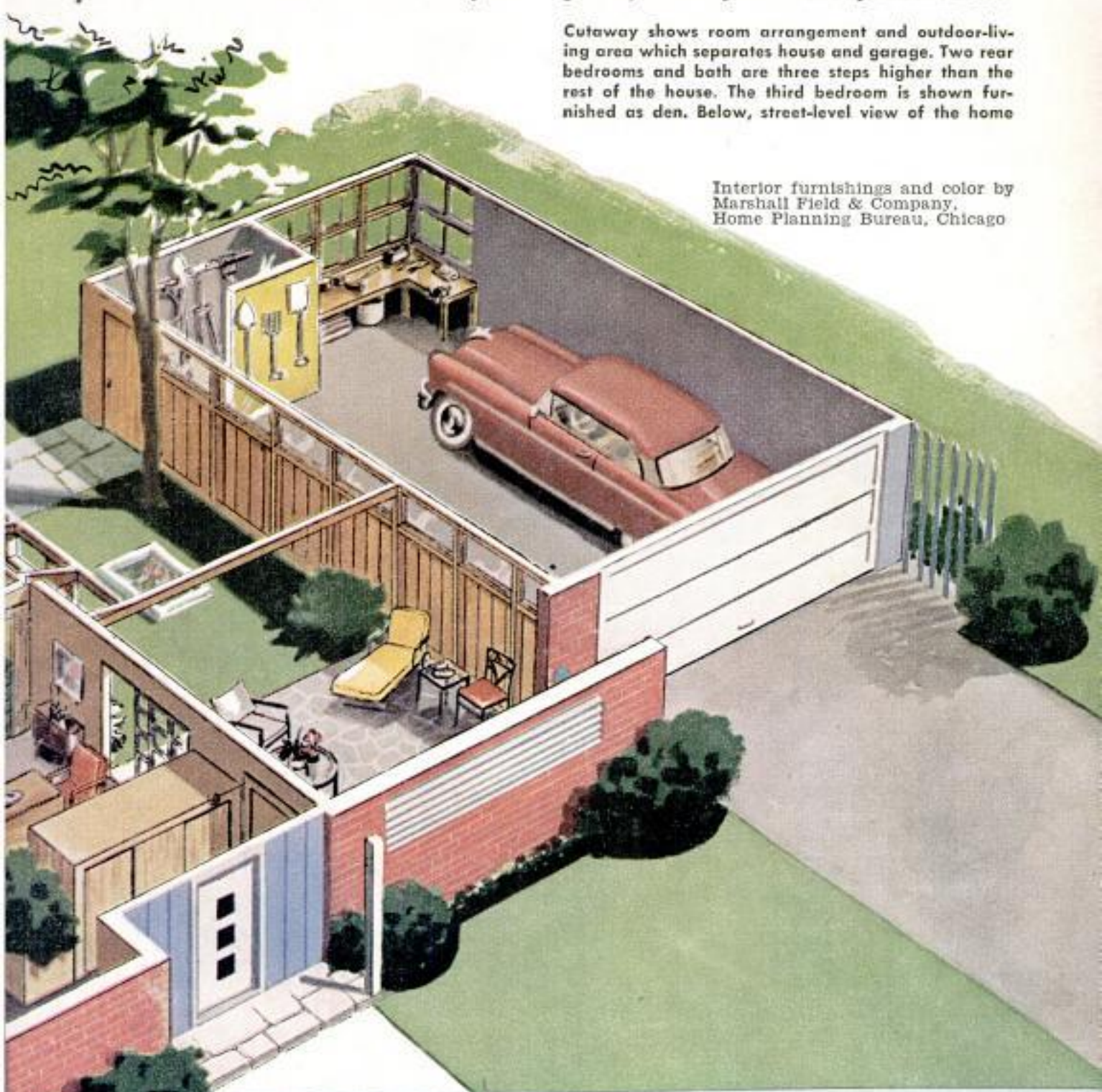


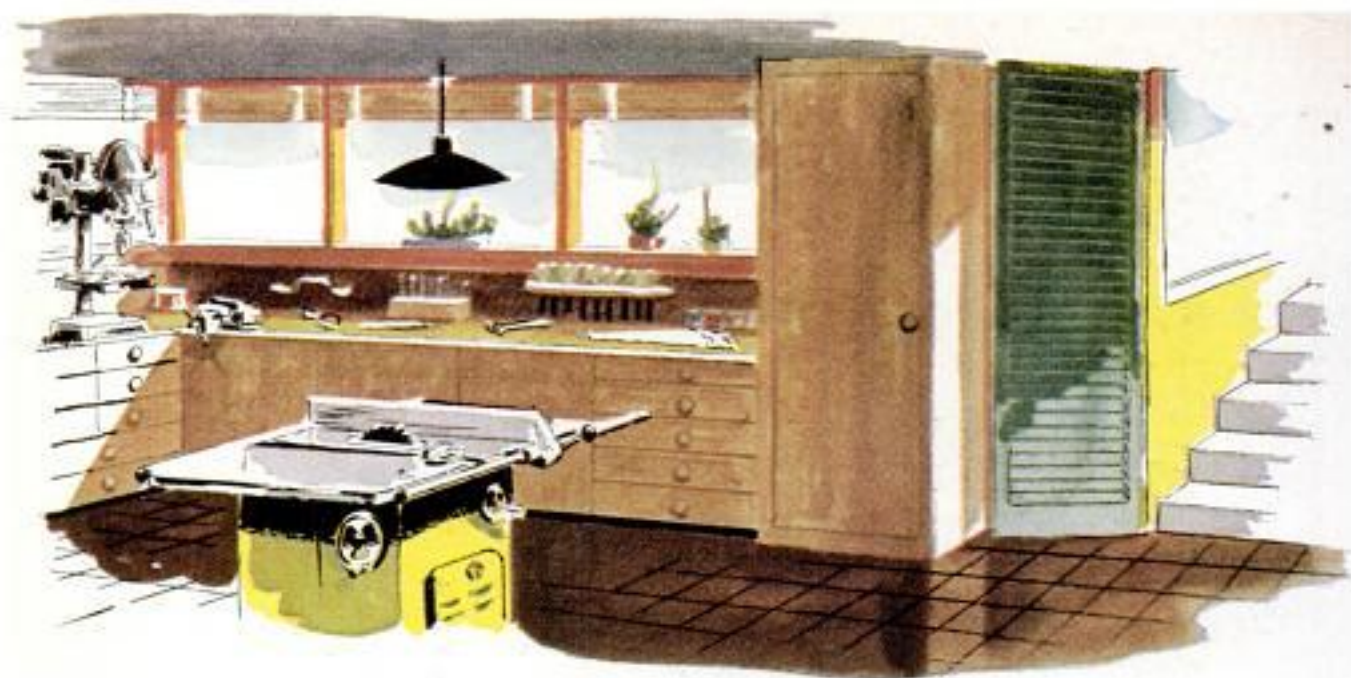
Matern's experience and ingenuity came the Survey Home shown on these pages. It is neither ultramodern nor stuffily tra-

ditional in feeling. Reflecting the desires expressed by a large cross-section of the public, it is truly "the house you asked for."

Cutaway shows room arrangement and outdoor-living area which separates house and garage. Two rear bedrooms and bath are three steps higher than the rest of the house. The third bedroom is shown furnished as den. Below, street-level view of the home

Interior furnishings and color by Marshall Field & Company, Home Planning Bureau, Chicago





Readers voted for a "sunny basement workshop with outside entrance." Architect Matern raised roof to do it

It will serve the wants of an informal family that loves beauty, comfort and convenience; that depends on its automobile for coming and going; that likes to entertain modestly and live outdoors as much as possible. The description fits the average American family of 1954.

Right from the beginning, the readers in filling out their detailed questionnaires

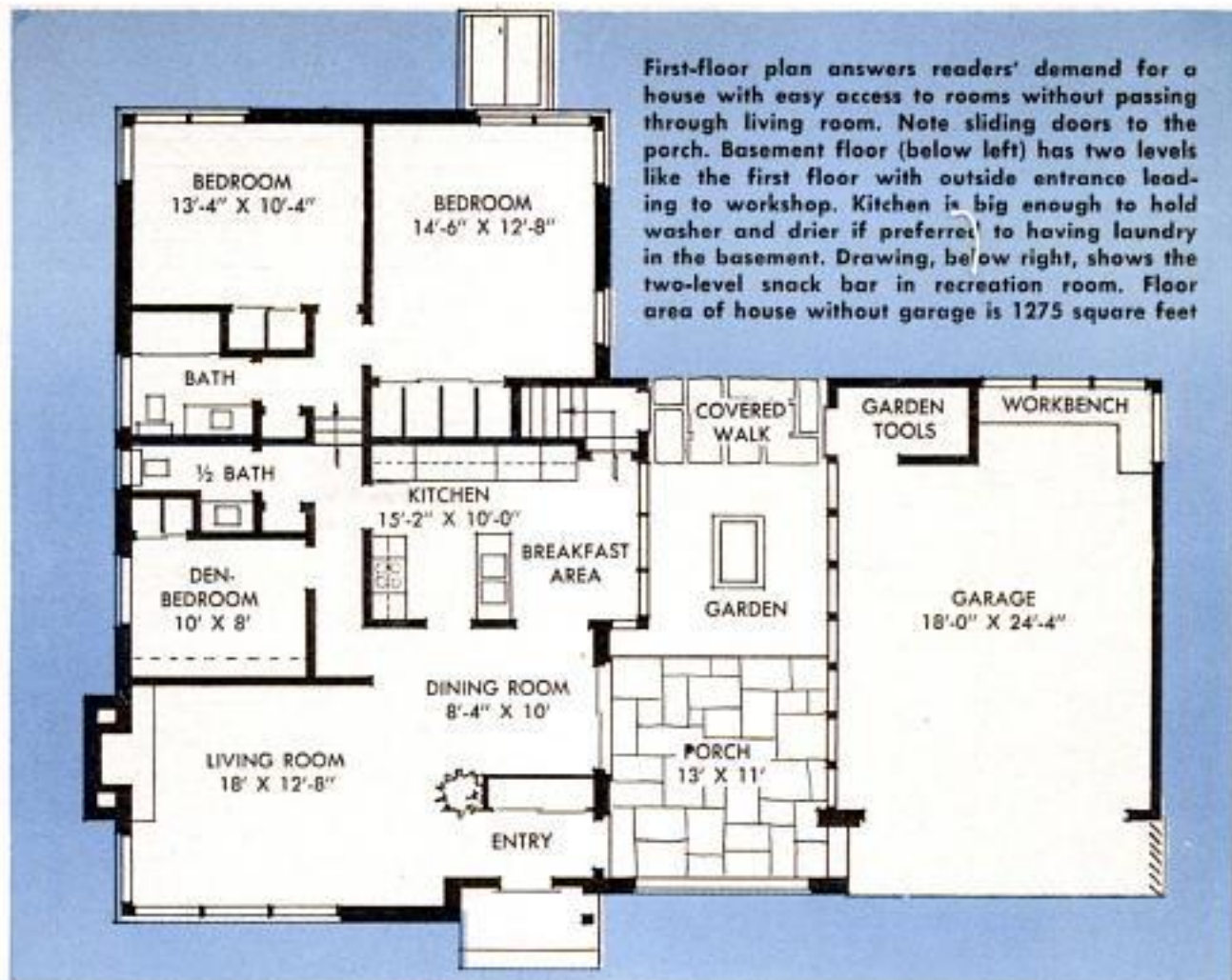
took matters firmly in their own hands.

"And where's the question about workshop space?" wrote an indignant reader from Decatur, Ala. "Possibly you intended the question about the basement to cover this point."

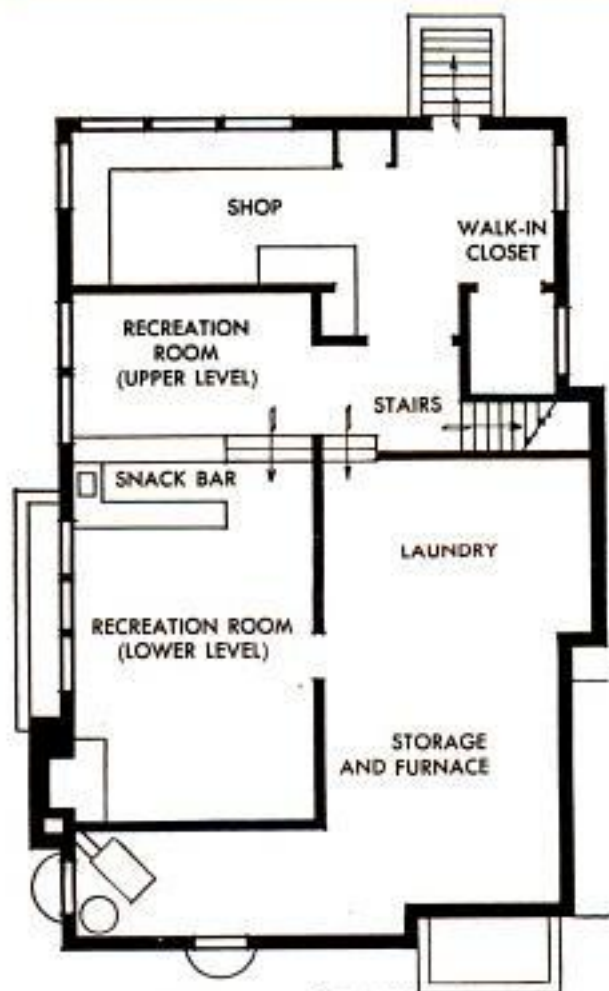
We had not included a question about workshop space because we took it for granted that any house designed by or for

Breakfast end of kitchen features skylight and window wall looking out on garden patio. Sink is island type





First-floor plan answers readers' demand for a house with easy access to rooms without passing through living room. Note sliding doors to the porch. Basement floor (below left) has two levels like the first floor with outside entrance leading to workshop. Kitchen is big enough to hold washer and drier if preferred to having laundry in the basement. Drawing, below right, shows the two-level snack bar in recreation room. Floor area of house without garage is 1275 square feet



our readers would have such an area. However, it seems that many readers have studied countless house plans—particularly those without basements—which simply do not have adequate space for a workshop.

The great majority of readers (79.5 percent) specified they do want a basement and that they would like their workshop located there. Many requests also



PERCENTAGES FROM HOUSING SURVEY

TYPE OF HOUSE		FIREPLACE FOR AN ADDITIONAL \$500	
Ranch type, one story, low-pitched roof.....	68.3%	Yes	58%
Traditional, Cape Cod, Dutch colonial, etc.....	19.8%	No	42%
Modern, flat or shed-type roof.....	13.2%	OUTDOOR LIVING AREA	
BEDROOMS		Yes	74.2%
Three	60.8%	No	25.8%
Two	27.6%	HEATING AND AIR CONDITIONING	
Four	11%	Furnace	59.3%
One6%	Year-round air conditioning for \$600 extra or more.....	31%
NUMBER OF STORIES		Neither of the above.....	9.7%
One	78.7%	GARAGE	
Two	13.7%	Two-car	66.7%
Split level.....	7.6%	One-car	23.3%
BASEMENT		Carpport	7%
Yes	79.5%	None	3%
No	20.5%	BATHROOMS	
EXTERIOR FINISH		One and a half.....	52%
Brick	48%	One	26.6%
Frame	28.1%	Two	21.4%
Shingles (cedar shake, etc.).....	17.1%	METHOD OF BUILDING	
Concrete block	9.8%	Build completely by yourself.....	16.5%
Others7%	Contract for foundation, plumbing, heating, electrical work, balance by yourself.....	22.7%
<i>(When figures exceed 100% it is because some readers checked two or more answers in the questionnaire.)</i>		Have contractor build shell and finish yourself.....	21.6%
DINING-ROOM ARRANGEMENT		Have professional contractor build the complete home.....	39.2%
Combination living-dining	34.9%	COST OF HOME NOT INCLUDING LOT	
Combination dining-kitchen.....	34.8%	\$7,000	7.1%
Separate dining room.....	31.3%	8,000	7.2%
KITCHEN ARRANGEMENT		9,000	6.2%
With breakfast area.....	68.4%	10,000	18.3%
Without breakfast area.....	11.3%	11,000	3.9%
Adjoining utility room.....	33.2%	12,000	13.3%
LIVING-ROOM ARRANGEMENT		13,000	4.6%
Living room at front of house with windows facing street.....	73.3%	14,000	4.3%
Living room at rear with windows facing yard.....	26.7%	15,000	13%
OPEN-PLAN ARRANGEMENT		16,000	3.1%
Yes	58.8%	17,000	2.2%
No	41.2%	18,000	3.7%
		19,0009%
		20,000	4.9%
		21,000 and over.....	7.3%

came in for an outside entrance to the shop. Some requested additional shop space in the garage, in addition to storage area for lawn mower and garden tools.

Matern's provision for workshop space is one of the outstanding features of the home. He literally raised the roof to do it (see cutaway drawing). This resulted in a higher ceiling for the workshop end of the basement, providing additional window area. Workshop fans will approve the handy outside entrance leading directly into the shop. (It's also convenient for children headed for the recreation room.) In addition, Matern has provided space for a workbench in the garage. If the house were to be built without a basement, this area could be enlarged to a full-size shop. The garage also provides adequate storage space for garden equipment.

The highest percentage in the poll concerned the demand for basements. This, no

doubt, will shock many modern architects who insist that "basements are a thing of the past." A reader from Wyncote, Pa., wrote: "A full basement gives plenty of room for furnace, fuel, water heater, laundry, lines for drying the wash, workbench and power saw. No house should be without one." This sentiment was echoed over and over.

The next highest percentage (78.7) favored a one-story home. In this group, 68.3 percent preferred the ranch-type with a low-pitched roof.

Another high percentage (73.3) requested that the living room be located at the front of the house with windows facing the street. Others logically pointed out that placement of the living-room and big windows would depend on the view (if any) or landscaping possibilities of the rear yard.

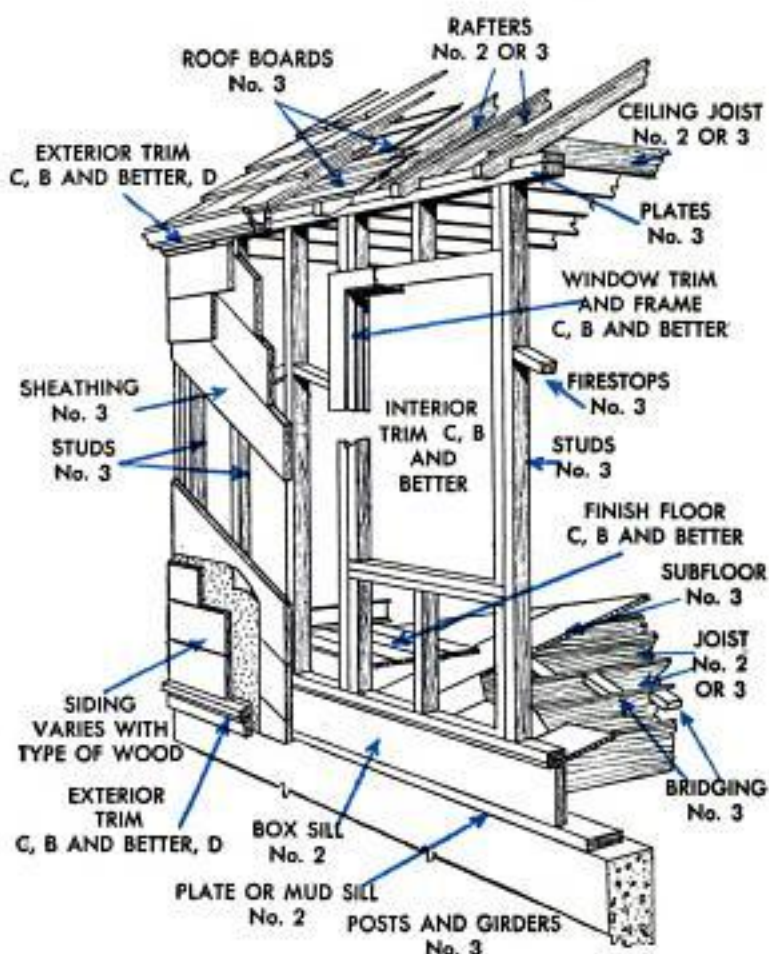
(Continued to page 256)

The RIGHT GRADE of LUMBER SAVES MONEY

NOT ALL THE lumber for your new home must be select stock, no more than all parts of your automobile need be tempered steel. Your home's soundness is highly important, but if you demand the best lumber throughout, you do not necessarily get a better house—it just costs you more.

By utilizing inexpensive grades wherever suitable, you can save up to \$1000 on the cost of a three-bedroom home. And if you take a 30-year mortgage, this saving is about doubled because interest, too, is saved. The cutaway drawing shows the proper use of various lumber grades in a modern one-story house. This construction complies with FHA specifications. No. 3 studs, though they have more knots than No. 2, have ample rigidity for the walls. In a two-story house, where the first floor carries the entire weight of the second, No. 2 studs should be used on the first floor and No. 3 on the second. Joists and rafters vary with their spans; No. 3 is ample for short spans, No. 2 or No. 1 for longer spans. For subfloor, walls and roof sheathing, No. 3 boards are quite adequate.

In exterior siding and finish flooring, the imperfections of a B or C grade will vary somewhat with different species, so look before you buy. You can save money in buying most sidings by purchasing shorter lengths. For the popular modern finish of using cedar siding with the rough side exposed and stained, specify a B or C grade; the small knots, waness and skips in planing will not show. Short lengths and a B or C grade mean a good saving in both softwood and hardwood flooring and often make a



more attractive floor than clear stock.

Many builders save on wood interior paneling by purchasing dry No. 1 common hemlock or pine boards and having a local mill run tongue-and-groove edgings on them, or use a molding to cover the joints. Result—knotty paneling at half price. A modern paneling is obtained economically by using C-grade hardwood or softwood flooring on the walls. For kitchen cabinets you can save without sacrificing quality by purchasing reject or utility-grade plywood and using the sections with imperfections where they won't show.

SAVINGS ON A \$14,000 THREE-BEDROOM HOUSE

MATERIAL	AMOUNT	COST HIGHER GRADE	COST SUITABLE GRADE	SAVINGS
COMMON BOARDS	5,500	No. 2 \$506	No. 3 \$310	\$ 196
COMMON FRAMING LUMBER	10,000	No. 2 \$960	No. 3 (60%) \$372	204
			No. 2 (40%) \$384	255
CEDAR SIDING	3,000	CLEAR \$720	C \$465	83
FINISH FLOORING	1,250	A \$294	B \$211	207
WALL PANELING	1,500	A \$360	No. 1 COM. RERUN \$153	37
PAINTED TRIM	800 FT.	CLEAR \$ 95	C \$ 58	70
CABINET PLYWOOD	1000 SQ. FT.	A-B \$265	UTILITY \$195	\$1,052



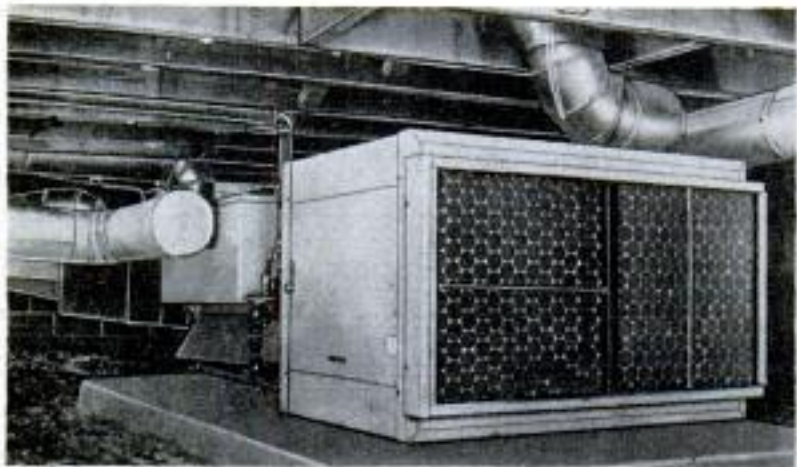
Iron Fireman Mfg. Co.

Compact vertical-type furnace may be placed in an inconspicuous corner of the basement or in a closet in utility room or kitchen



National Warm Air Heating and Air Conditioning Association

New space-saving designs in forced warm-air heating units make it possible to stow furnace in attic (above) or crawl space (below)



Space Savers for Heating or Cooling

NOT TOO MANY YEARS ago it was taken for granted that the furnace would be found in the basement, that it would be a metal monster and would have an octopus system of huge pipes. In the modern or reconditioned home of today, a new space-saving heating and cooling plant may not only be inconspicuous but actually hard to find.

The words "furnace" or "heating plant" are frowned upon by engineers who rightly prefer "winter air-conditioning system." And why not? The air in many forced-air systems is filtered before being heated and circulated. Also, the same fans and ducts may be incorporated in the conversion to summer air conditioning.

The modern furnace may be found in a number of out-of-the-way places including a kitchen or utility-room closet, attached garage, attic, crawl space beneath the floor, and the basement. Trim and efficient, the compact units would never be recognized for what they are by the householder of 20 years ago.

The space-saving types of heaters include the vertical



National Warm Air Heating and Air Conditioning Association

There are no cumbersome overhead pipes in this recreation room equipped with vertical reverse-flow furnace

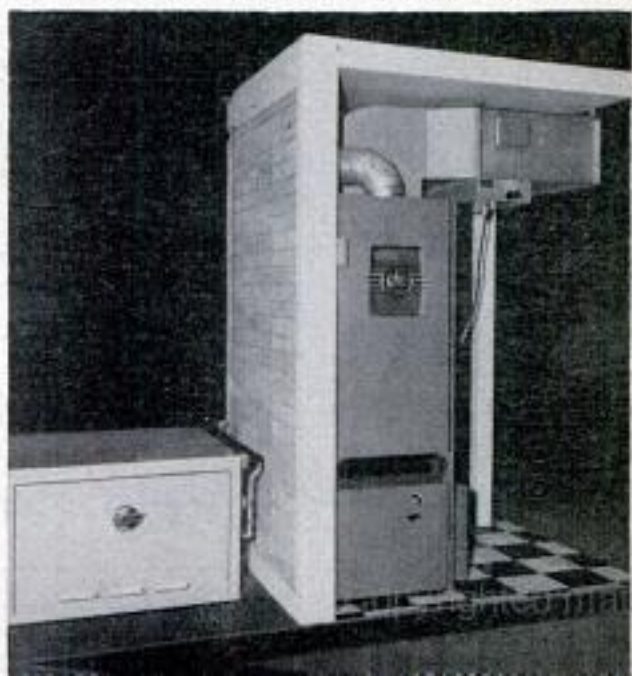
furnace, the horizontal, the reverse flow and the floor furnace. Additional space is required for cooling units—but not much. The vertical furnaces are tall and narrow and are designed to fit in a closet or any small built-in compartment. Many of these occupy a third or less of the floor space required by an ordinary furnace. The horizontal furnace, particularly adaptable for perimeter heating, is ideal in crawl space or attic as well as in the basement. Despite the size, this unit comes equipped with efficient firing unit and heat exchanger, air filters, humidifier and air-circulating fan. The vertical reverse-flow furnace discharges the warm air at the bottom of the unit. A new floor furnace is of the reverse-flow type. ★ ★ ★

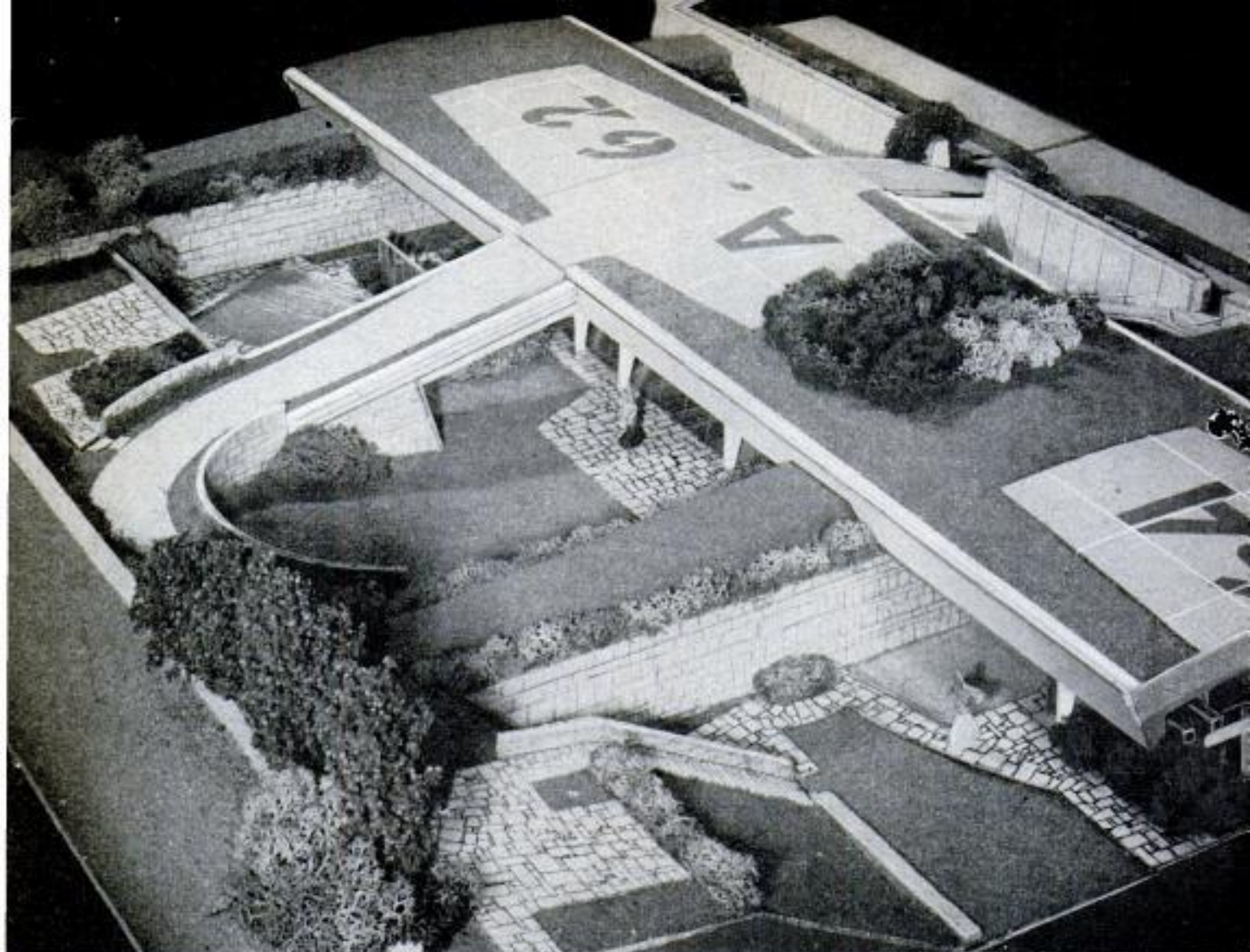


Airtemp Division, Chrysler Corporation

A small corner of the utility room accommodates a furnace which serves a perimeter system. Return air circulates through filter in top, eliminating grilles

This room air conditioner for casement windows has grille sections held by springs for changing direction of air. Below, year-around heating and cooling





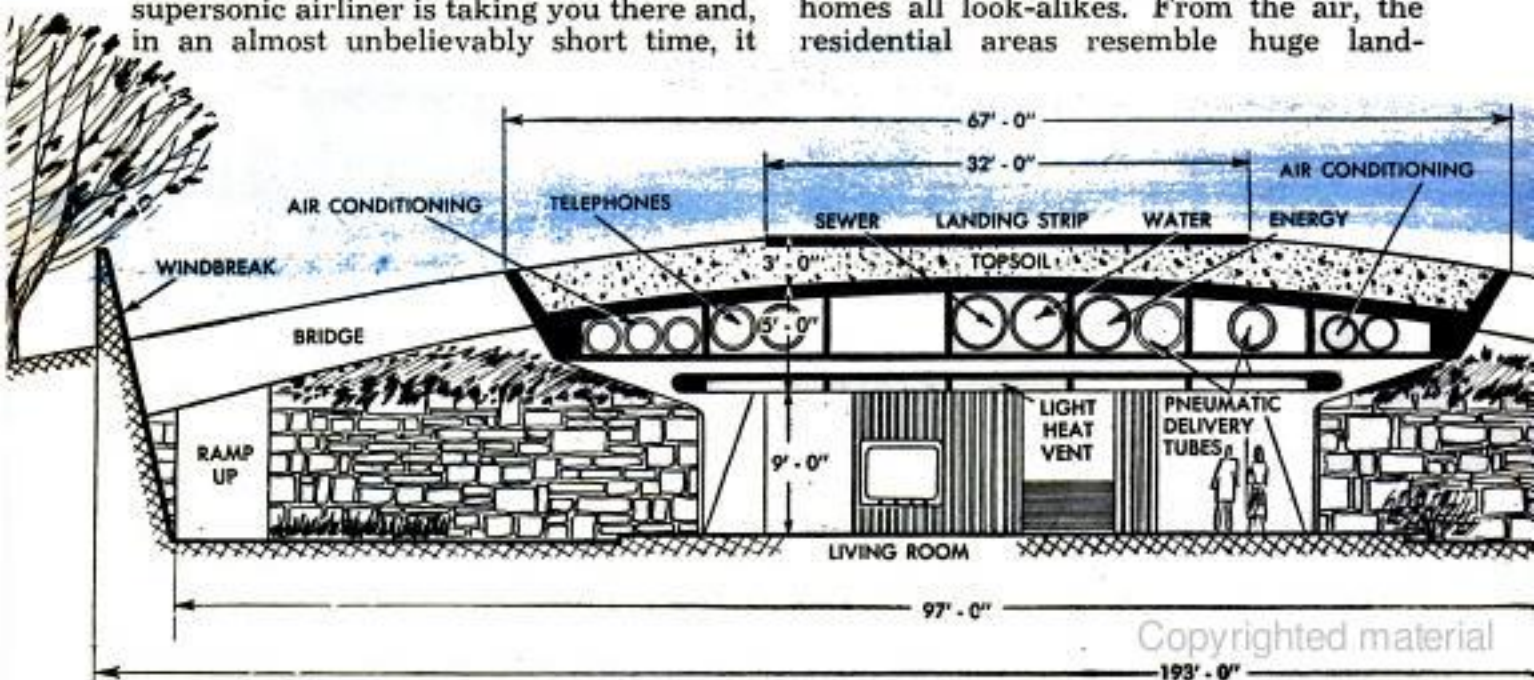
You'll land your copter on the roof, keep it in the flyport and live underground, according to Laszlo

AT HOME, 2004 A.D.

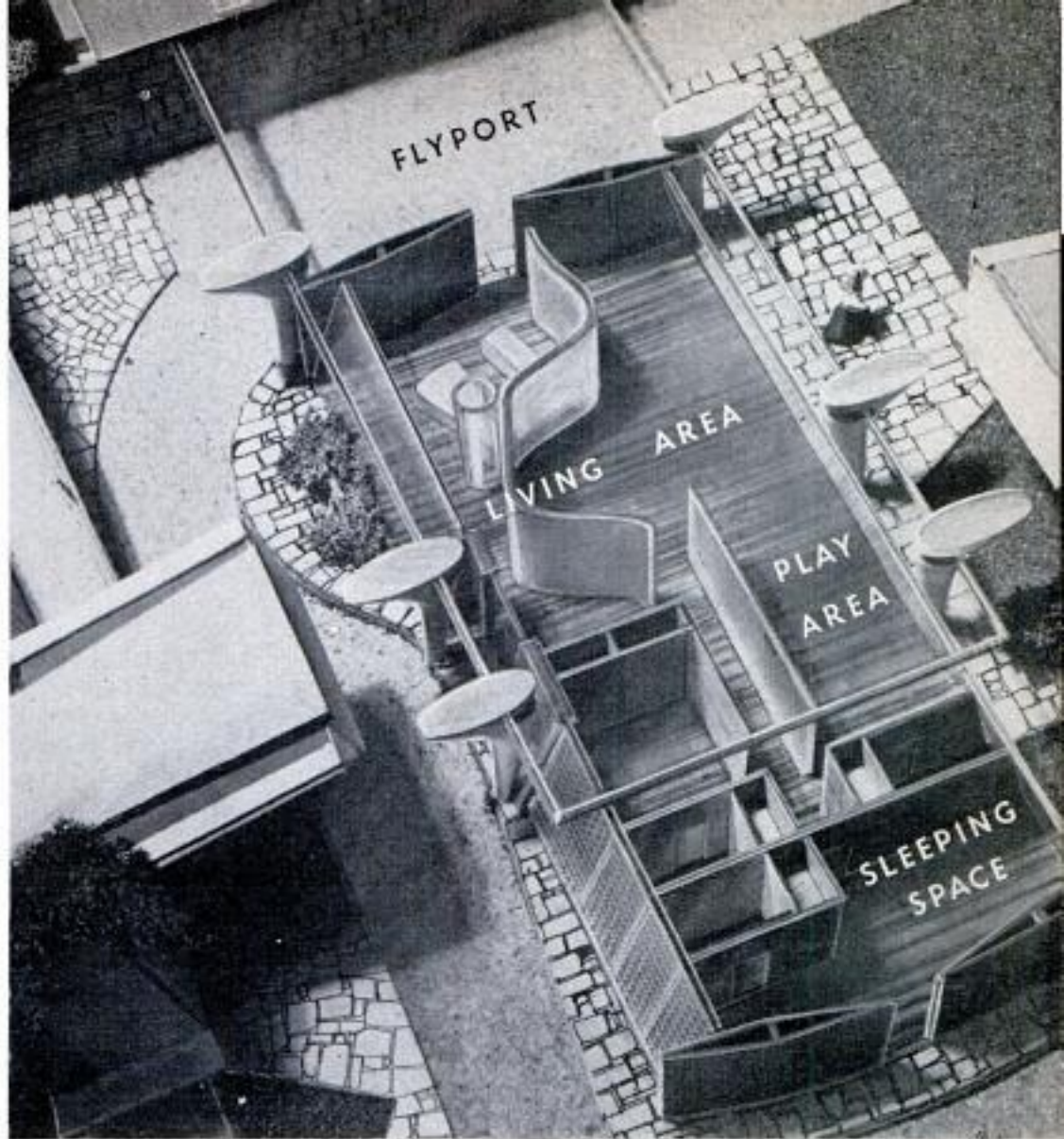
By Carson Kerr

SUPPOSE it's a sunny Saturday in 2004 A.D. and you're on your way to visit the Smiths in Atomville, one of America's new—completely new—communities. A supersonic airliner is taking you there and, in an almost unbelievably short time, it

approaches the Atomville airport. This city of the twenty-first century is laid out along strict radial lines, its streets running in concentric rings from the center and its homes all look-alikes. From the air, the residential areas resemble huge land-



Copyrighted material
193'-0"



Architect's model shows how living area is separated from sleeping area. Concrete pillars support the roof

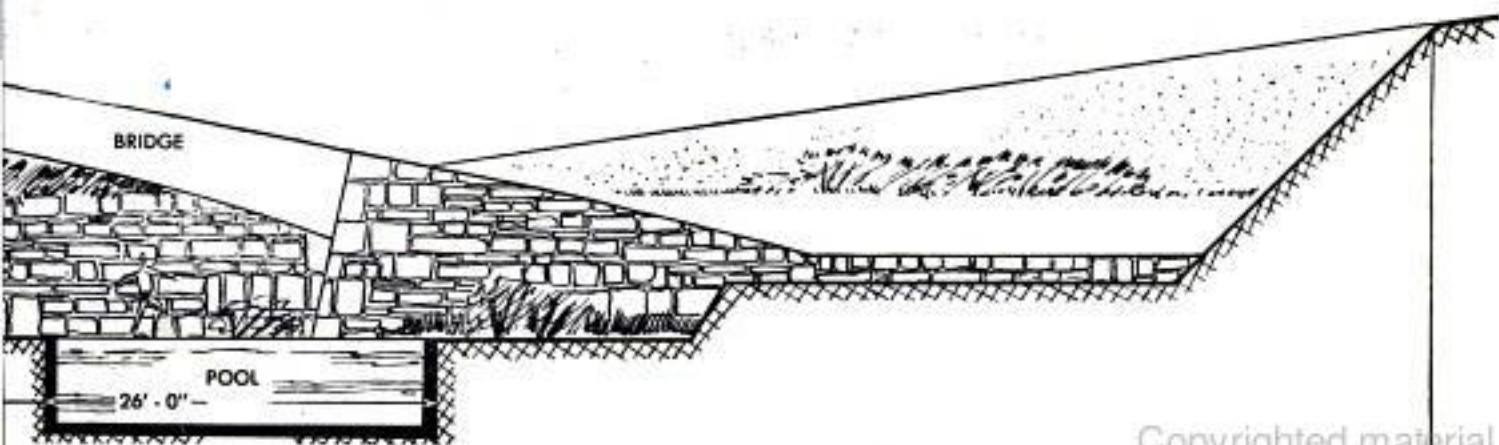
scaped parks, criss-crossed with highways like the spokes of a colossal wheel.

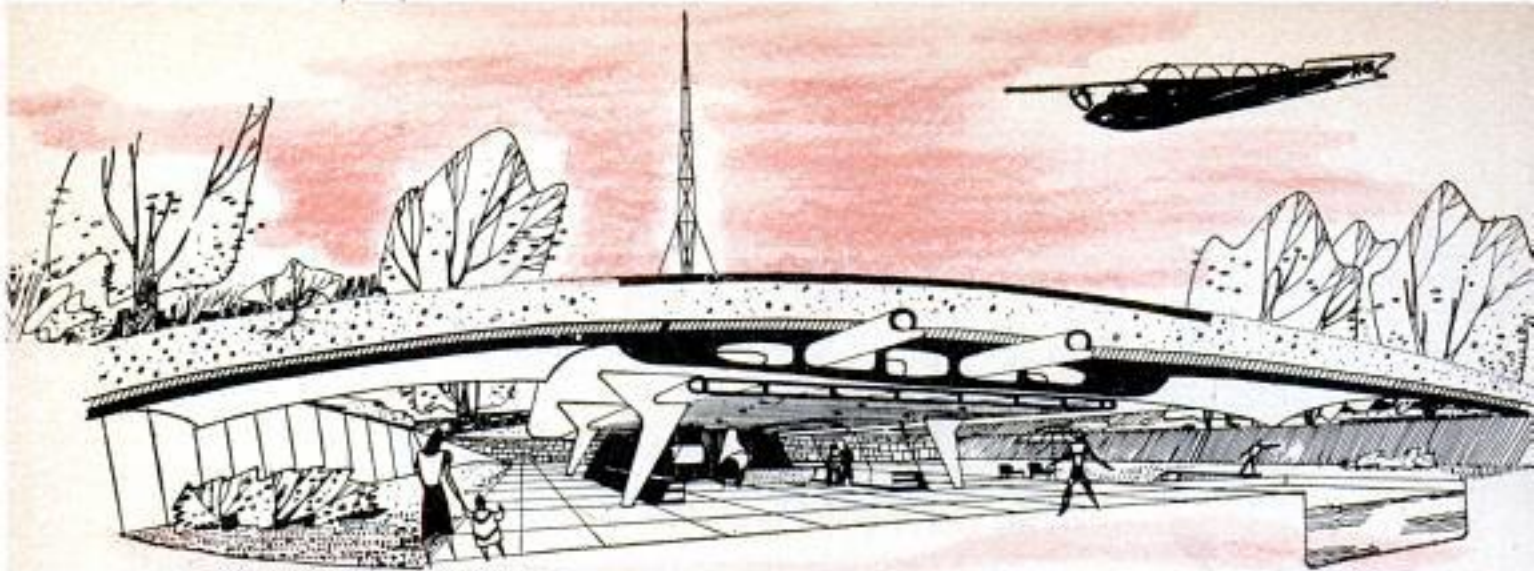
Shortly after the ship lands you transfer to a helicopter bus which has been waiting to whisk plane passengers to the city's center. On the way you notice there is more traffic in the air than on the streets below. Downtown, you take a taxi to the Smith home.

When you ring the doorbell, you're greeted with a cheery call coming from inside the house, where you've been recognized on the TV intercom. This, of course, comes as no surprise as home sight-and-sound hookups were common back in 1970.

What does open your eyes is the Smith's

new dishwashing system, which has only recently been installed. Because the novelty hasn't yet worn off, your hostess loses no time in demonstrating what she can do with it by just pushing a button. She serves you afternoon coffee, after which the dishes and silverware are placed in a cabinet alongside the table. The system is then set in motion and the dishes disappear through a door in the wall. A few minutes later, Mrs. Smith suggests that you step into the kitchen to see these same articles—clean, dry and sterile—neatly arranged in another cabinet there. Like all other kitchen components, she explains, this cabinet is mobile and can be raised or lowered





Open feeling of the house is reflected in Laszlo's sketch. Family lives on every square foot of the site

with the pull of a lever. The conveyer-dishwasher can be easily switched from one outlet to another, and preset to clean, sort and store even the finest china with speed and safety.

After suggesting a new arrangement for the kitchen, you ask, "Where's Bill?"

"He's working an extra day this week," she answers, "but doesn't mind it much. Since becoming a copter commuter he saves more than eight hours a week in traveling time. He'll be dropping down in about 10 minutes, so let's go out and watch for him."

Waiting for Bill to hover over the house, you ascend the ramp to the roof. As you look up and down the street, you're struck by the total absence of unsightly poles and the fact that nowhere in sight is there a dwelling larger than a one-family unit. Air transportation is making the multi-family apartment house obsolete, as each family now needs a private landing strip.

You're impressed by the aesthetic landscaping on all sides. Even a casual glance shows you that the Smiths and their neighbors have brought true meaning to that mid-twentieth-century housing cliché of "living on all of your lot." Although the homes are hidden under earthen shells, these coverings are open at the sides and the buildings are surrounded by terraced lawns and gardens.

Dozens of helicopters, convertiplanes and other aircraft are coming and going overhead and you watch a "converti" come to rest on a roof up the street. Mrs. Smith points out that they use their car mostly for visiting in the neighborhood and hardly ever drive it outside Atomville.

Right on schedule, Smith sets his six-passenger helicopter on the near-by landing strip, then hops out to shake hands with you. He takes you aboard the copter, taxis down the ramp and parks it in the flyport. Later, as you sit chatting by the swimming pool, he tells you how he came close to

colliding with a converti on the way home when the pilot flying in front of him failed to signal for a drop-down.

"It's a good thing our 'eggbeater' has a radar safety system," he remarks. "They'll probably make it compulsory equipment any day now."

The foregoing glimpse of family life in the next century is no idle daydream. It's the authoritative view taken by California architect and interior designer Paul Laszlo, who has pioneered many of today's building trends and accurately predicted others. This forecast is the result, not only of the 30 years in which he has become increasingly famous for design, construction and decoration, but of three years of study and experimentation during which he conferred with manufacturers, transportation heads and communications experts, as well as architects and contractors.

To some, perfection of the hydrogen bomb has meant profound anxiety; for others, it holds the promise of permanent peace. Laszlo looks beyond both and sees it as the beginning of a period of unprecedented progress out of which must come a whole new way of life.

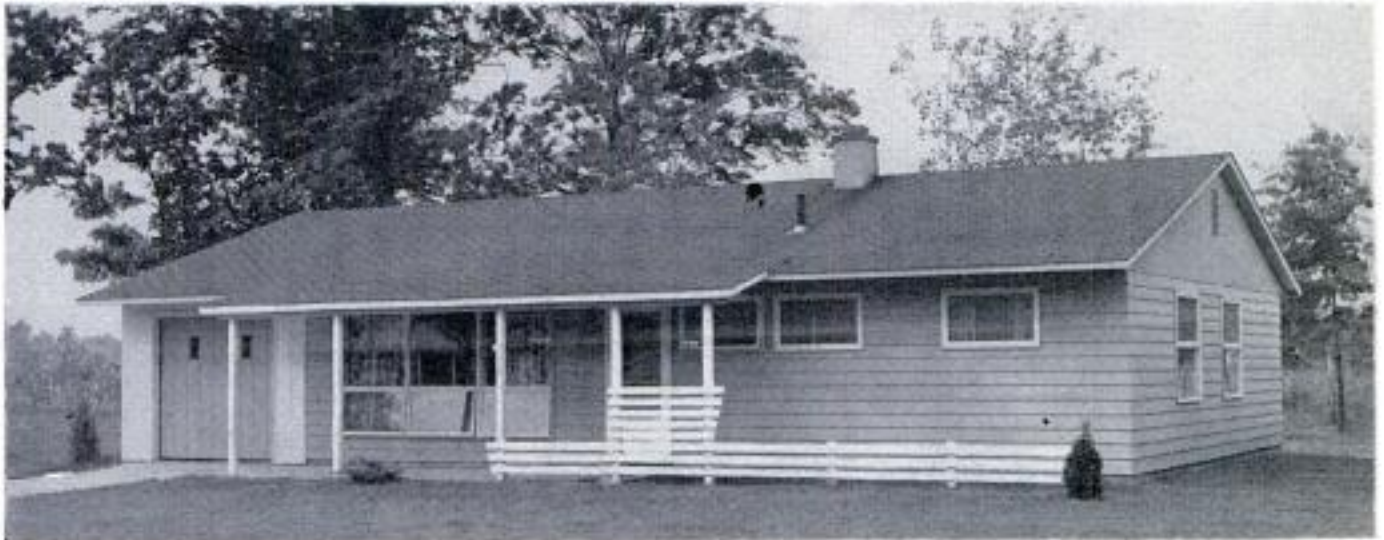
"I think of how the atomic-age houses will look," he says, "when man's mastery of the atom will maintain life. Innovations will become apparent that will make Bucky Fuller's Dymaxion house and his geodesic dome appear old-fashioned. When I say that the family of the future will go underground, I'm immediately categorized as a political pessimist. Let us say I hope for the best, but would want to be prepared for the worst.

"Subterranean construction would not be just a protective measure. To begin with, air transportation will be the main mode of travel, requiring an absence of obstructions and an abundance of landing areas. Increasing population will put a premium on acreage and will eventually

(Continued to page 266)

PARADE OF HOMES

..\$7,250 to \$15,000



Built in South Bend, Ind., by Place Homes, Inc., this three-bedroom frame house sells for \$14,750. The foundation is slab. It was designed by William A. Weist. Floor area of the house is 1120 square feet and the garage 392. Roof overhang extends six feet

Three bedrooms, 1½ baths
Floor area—1120 square feet
Price—\$14,750 (not including lot)

The eight houses featured in this parade of low-cost homes were selected by the editors of *Popular Mechanics* for their economy, livability and excellence of design. Simplicity, both inside and out, is the keynote of every one of these distinctive homes. They were designed and built by some of the best architects and builders of low-cost homes in the nation. The localities where the houses have been built span the country from New York to California and the Northwest but, regardless of where they have been constructed, each house would be "at home" in almost any part of the United States.

Three bedrooms, two baths
Floor area—1389 square feet
Price—\$15,000 (not including lot)

Designed by Rudolph A. Matern & Associates, this brick-veneer house was built by Morton Brothers in Plainfield, Long Island, N. Y. It features a living room at rear. Minimum lot size required is 65 by 100 feet. Has a full basement with oil-fired warm-air furnace and gas water heater. The kitchen has birch cabinets, double porcelain sink and included in the price are gas range, a wall oven and fans



Three bedrooms, one bath
Floor area—882 square feet
Price—\$9750 (including lot)

This house was designed and built by Crawford & Conover, Inc. (Albert Balch), Seattle, Wash. It is of frame construction with vertical siding. The three-ply built-up roof has wide overhang. Floors are of hardwood and the forced warm-air heating system is of the perimeter type. The carport with storage space at rear could be easily enclosed as garage



Three bedrooms, one bath
Floor area—1250 square feet
Price—\$14,700 (not including lot)

This home may resemble California houses in style, but it was constructed to withstand Minnesota winters by Norsen Company (Robert A. Norsen), designers and builders, Minneapolis. It has a special slab foundation and the floor is covered with insulation board and cork. All windows are double glazed. Interior view shows end of living room with big windows, paneled wall and vaulted insulated ceiling





Three bedrooms, two baths
 Floor area—1255 square feet
 Price—\$14,750 (including lot)

Architects Jones & Emmons of Beverly Hills, Calif., have used glass walls and doors along with open planning to give this home a spacious effect. It was built by Eichler Homes, Palo Alto. View of rear patio shows glass area of living room. Other features include radiant-heated slab floor, wood paneling in all rooms, cork floor in living room, beamed ceilings, insulated roof and concrete patio. Price includes electric range



Two bedrooms, one bath
 Floor area—790 square feet
 Price—\$8500 (including lot)

Built in Beaverton, Ore., this house was constructed on a wooded lot with attractive exterior siding of lapped rough cedar. The low-pitched roof with wide overhang at the front has slots to admit extra light to the big living-room windows. All windows are wood frame, floors are of hardwood and the walls are plastered. The house was designed by Home Building Plan Service Co. and recently constructed by Franklin & W. W. Nelson of Portland



Four bedrooms, two baths
 Floor area—1100 square feet
 Price—\$10,000 (including lot)

Bedrooms in this house are 12 x 11, 13 x 9, 11 x 10 and 11 x 9. The living room is 18 x 12. It was designed and built by the Earl W. Smith Organization in El Cerrito, Calif. Construction is frame with stucco exterior and dry-wall interior, beam-and-plank roof topped with insulation and three-ply tar-and-gravel surface. The foundation is concrete slab and all floors are asphalt tile. Heat is supplied by two wall units. Two-car garage has overhead door



Three bedrooms, one bath
 Floor area—1042 square feet
 (including garage)
 Price—\$7250 (not including lot)

Front entryway permits access to bedrooms or kitchen without going through living room which is at rear. Fireplace with open space above adds pleasing effect. Construction is with a slab foundation and conventional frame, hardwood floors except kitchen and bath which have asphalt tile, composition roofing. Doors and kitchen cabinets are mahogany. Designed by Mogens Mogensen and built by David D. Bohannon of San Mateo, Calif.





Are you planning to build your own home? Here's advice from three men—a Pullman conductor, an engineer and an artist—who have done just that. We invited them to our Chicago offices for this discussion which is climaxed with the \$64 question:



Would You Build It

PANEL PARTICIPANTS: *H. E. Lindblom, Arcadia, Calif.; Herbert Schildt, Mount Kisco, N. Y., Robert O'Neil, Glen Ellyn, Ill.*

QUESTION: What is your occupation and what previous experience in the building trades had you had—such as carpentry and masonry—before you built your own home?

O'NEIL: I am an artist, do layouts, cartoons and all that sort of thing. When I was in Aspen, Colo., before coming to our Chicago suburb of Glen Ellyn, I did some rough carpentry work. In high school, I built some cabinets.

SCHILDT: I'm an engineer and live in Mount Kisco, N. Y. The only experience I had was field work for a large contracting company.

LINDBLOM: I am a Pullman conductor. That gave me a little better break than the average man in building because I'm a week on the road and a week at home in Arcadia, Calif. A number of years ago I built an addition on a small house.

Q: Are ownership of and experience with power tools essential in building your own home?

O'NEIL: I started pretty much from scratch. I bought a portable electric saw and started using it.

SCHILDT: Power tools aren't necessarily essential, but they are a great help in the time factor. I had a bench saw given me, and I bought a portable saw and an electric drill.

LINDBLOM: I wouldn't attempt to build a house without at least two essential electrical tools, a portable saw and a bench saw.

Q: What hand tools did you use?

O'NEIL: Hammer, hatchet, hand saws, an ax for making stakes and so forth.

SCHILDT: One of the most important is the carpenter's square. When I started cutting rafters, I measured the first one I cut with a tape and I said to myself, "There must be an easier way." I got a carpenter to show me how to use the square.

LINDBLOM: I would like to mention a little gadget I made myself which was a tremendous help. I took an eight-foot pole and marked it off in the middle. That gave me a four-foot measure. In between, I had marks for my 16-inch centers. Whenever I found I needed a rather long measurement, say 10 or 12 feet, I used this pole along with my steel rule for measurements over eight feet. I found I was always reaching for that pole.

Q: What did you do about preliminary plans and architectural drawings?

O'NEIL: We just went to a lumberyard and got several books of stock plans. Just picked out one we liked. I found out too late that the plan we took called for a lot of wastage of wood.

SCHILDT: I drew my own plans to conform to the length of wood that was avail-

able in the lumberyards. The plans were approved by the building inspector before a construction permit was issued. One thing I learned in buying lumber is that when you buy 2 by 4s, always buy a 16-foot length. Never buy 8-footers, because when you are cutting your studs for an 8-foot ceiling height with your sill and your double plate, you are cutting off approximately 5 inches on an 8-foot piece. If you have a 16-footer, you cut off 10 inches plus the two inches that is oversize. This gives you a 12-inch piece that can be used for a lot of things, whereas 5-inch pieces are just scrap.

LINDBLOM: I used *Popular Mechanics* ranch-house plans and bought my lumber according to specifications. I found the plans to be very specific and had no trouble. I had no construction problem or actual building mistakes.

Q: How did you decide to build your own home?

O'NEIL: I read somewhere that approximately a hundred thousand people a year are building all or parts of their houses, so I figured we could do it too and get a lot more house by putting in our own labor.

SCHILDT: My wife, Mary, and I looked at homes on Long Island where we lived. The prices were away out of our reach so we decided to build our own place.

LINDBLOM: I also found the prices too high for us. We bought a half acre in Arcadia with a small house on the back of the lot and a two-car garage in the front.

Q: Did you select the type of home you built because you thought it would be easier to build yourself?

O'NEIL: Not particularly. We just picked a ranch-type plan we liked.

LINDBLOM: We followed the Tom Riley



Yourselves Again?



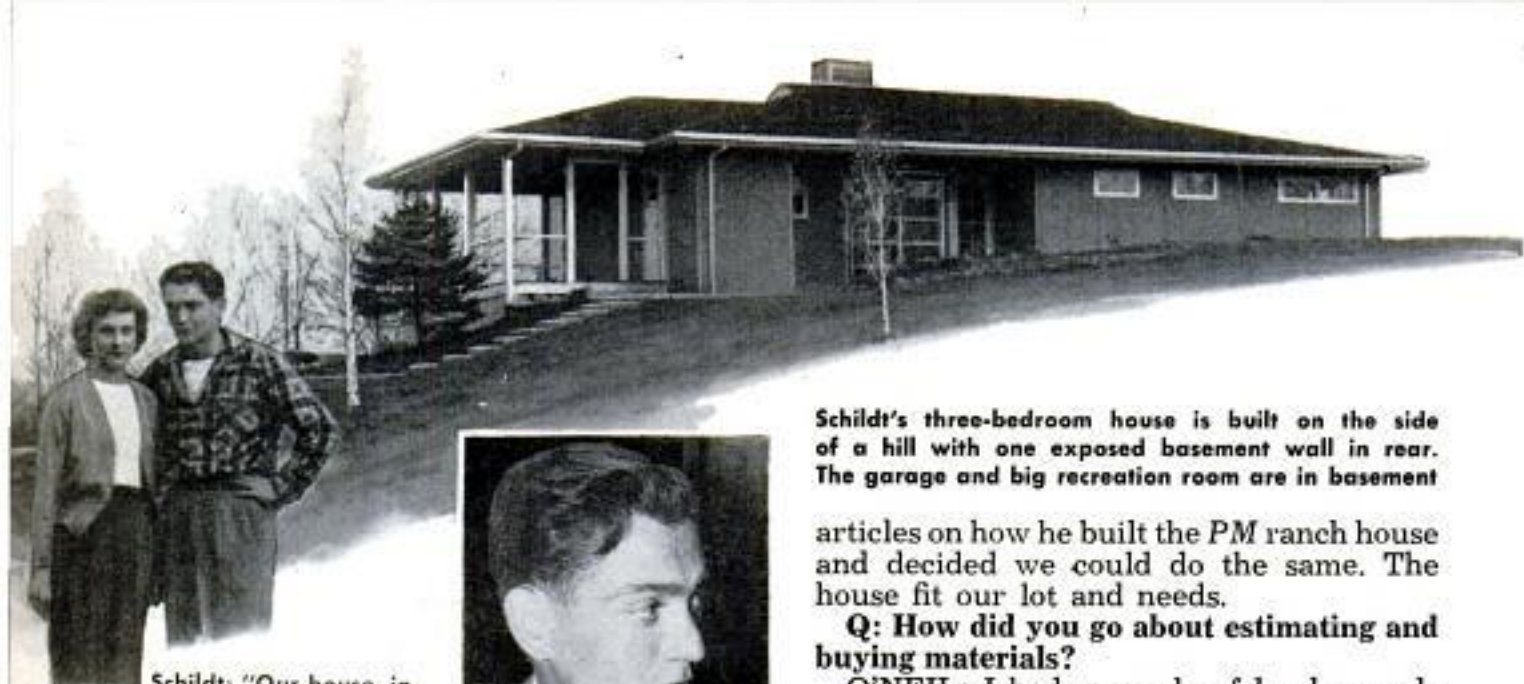
Mr. and Mrs. H. E. Lindblom pose in front of the PM Ranch House which they built themselves for \$7000, not including lot, in Arcadia, Los Angeles suburb

Lindblom: "I figure it took me 4½ months of actual building . . ."



Floor plan of Lindblom home shows careful planning for basementless house. Den with adjoining half-bath can serve as third bedroom. Floor area of this house, not including garage, is 1350 square feet





Schildt: "Our house, including lot, cost me \$18,000. It's worth all of \$35,000 right today."



Schildt's three-bedroom house is built on the side of a hill with one exposed basement wall in rear. The garage and big recreation room are in basement

articles on how he built the PM ranch house and decided we could do the same. The house fit our lot and needs.

Q: How did you go about estimating and buying materials?

O'NEIL: I had a couple of lumberyards estimate it. I found they estimate as low as possible. When you actually come to buying materials they run a lot higher.

SCHILDT: I figured out the materials I needed and then sent my plans to several lumberyards and let them figure. They came out with much more lumber than I specified and they were right. My wife did the buying. She called every lumberyard for miles around and said, "We need so much of this. Will you quote us?" Somebody would say \$130 a thousand, and she would say, "Sorry, not good enough. I had an offer of \$108." They would say, "We'll give it to you for \$106." You can save a pile of money if you shop around. A contractor I knew gave me the glass for the windows. I think our lumber was originally estimated at \$3000 and came closer to \$4000.

LINDBLOM: I found figures in the plans I used very accurate. I had no problem. I showed the plans to several lumberyards and they made estimates.

O'NEIL: It's a good idea to consult your building commissioner before you make final estimates. He changed the spacing on my floor joists and that added to the materials right there.

Q: Mr. O'Neil and Mr. Schildt, do you feel you would have saved any money if you had used carefully worked out how-to-do-it plans?

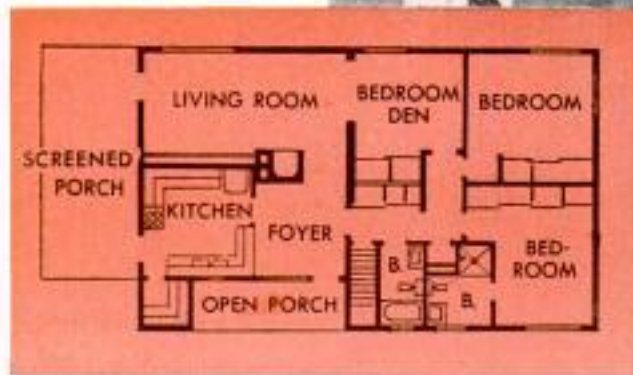
O'NEIL: I certainly do.

SCHILDT: I could have saved quite a bit because I made some foolish mistakes.

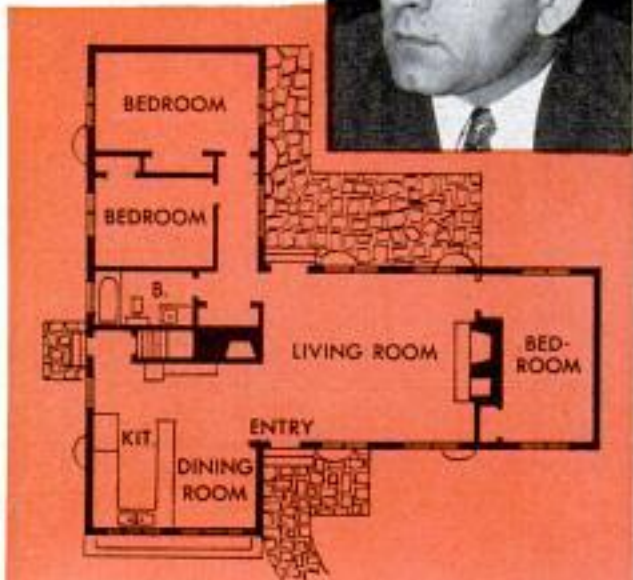
LINDBLOM: I feel that the how-to-do-it plans helped me enormously. I followed those plans to the letter with the exception of a few changes the building commissioner made in regard to window headers.

O'NEIL: In my case, I took the floor plans, put the basement in, and from then

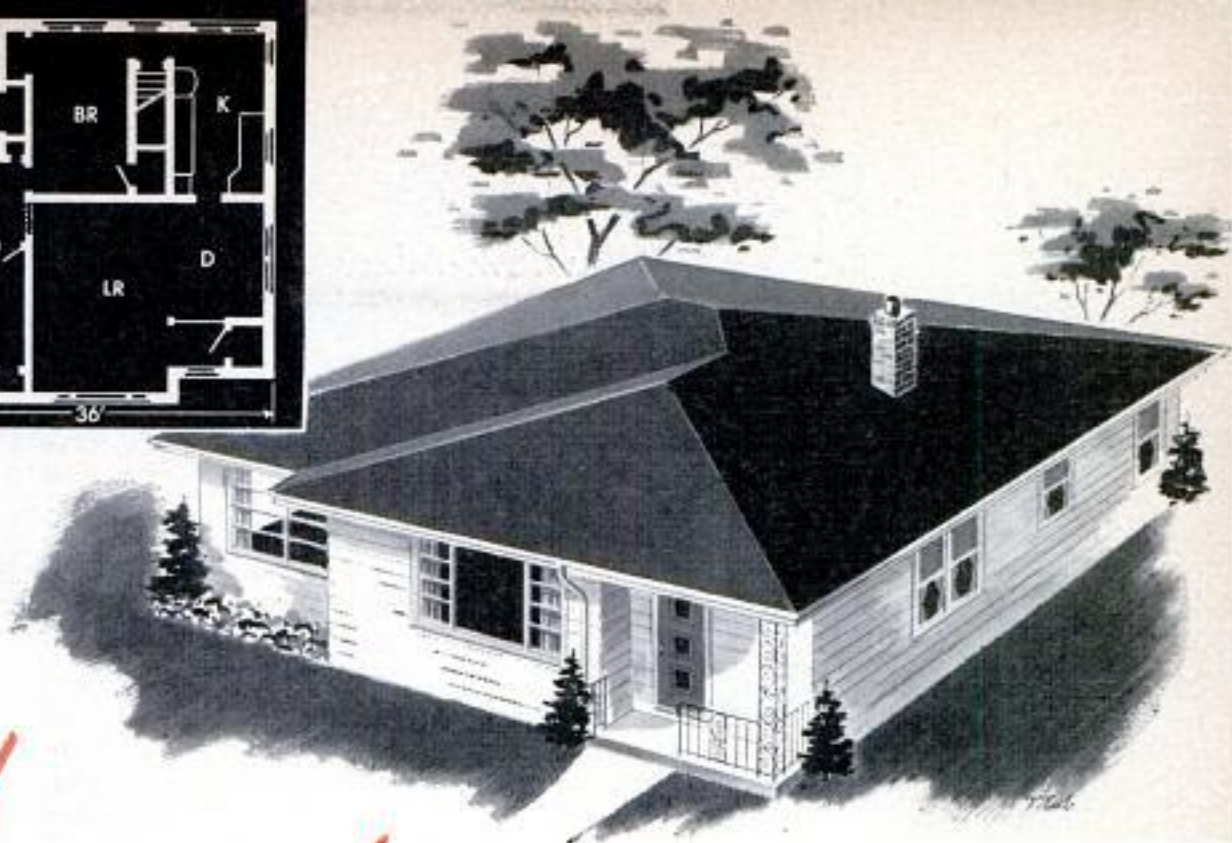
(Continued to page 276)



O'Neil: "If I put it up for sale I might get \$25,000. It cost me \$14,000 plus my labor"



Left center, the O'Neil family stands proudly in front of their new Glen Ellyn home. The house has a full basement, two fireplaces and patio at rear



How much WILL IT COST?

UP GOES the price every time you add anything to a basic house plan. Above is a typical three-bedroom home. The specifications call for the best of materials, including automatic heat, birch cabinets and doors, Formica countertops, a double-glazed picture window, a tiled bath, and vinyl floors in kitchen and bath. Murray & Ingle, experienced building contractors of Villa Park, Ill. (a Chicago suburb), made

the bids shown below. Building costs in your area may vary widely from those around Chicago. However, the costs shown here will give you a comparative idea of what it will cost to add items to a basic house plan in your area. If building costs in your area are lower, each of the costs shown here likely will be lower, but relationship between items will be about the same. The bids do not include price of lot.

	Basic home in frame	\$15,900
	Basic home in brick veneer	16,800
	Add a full basement	1,000
	Add a one-car attached garage in frame	1,200
	Add a two-car attached garage in frame	1,650
	Add a one-car attached garage in brick	1,500
	Add a two-car attached garage in brick	1,900
	Add a fireplace	650
	Add a 12-by-14-foot porch (roof and floor only)	1,000
	Add the same porch with jalousie windows, screens	2,000

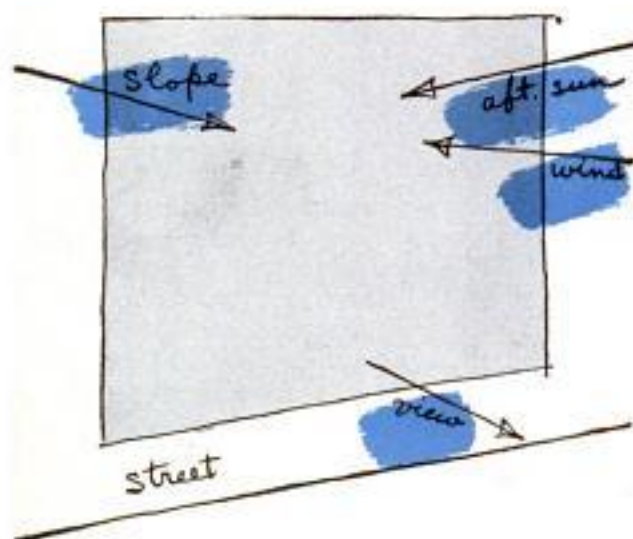
	For each square foot added to the home in either brick or frame	\$14
	Each additional electric outlet not shown in plans	7
	Replacing door in plan with a disappearing sliding door	26
ALLOWANCES		
	Allowance for decorating the home yourself	650
	No tile in bath	175


 Cost of brick-veneer home, full basement, attached two-car garage, fireplace, finished porch — \$22,350

Plan Your Home With Circles

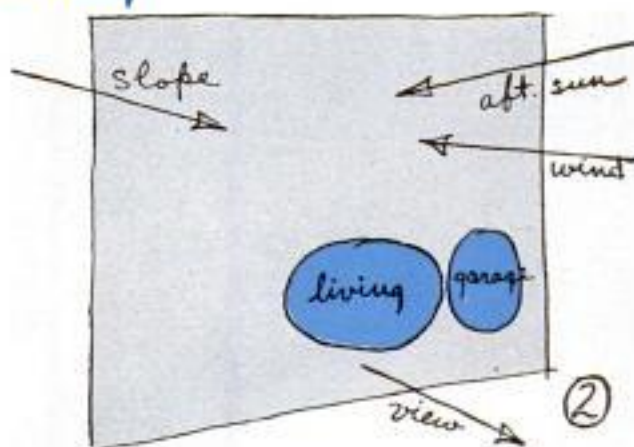
by Tom Riley

HERE'S AN EASY way of planning your new home. You doodle with circles. This is both simple and basic and gets down to blending the good and bad features of the lot with the things you want most in the house and that is an important factor often overlooked in the welter of scaling door sizes, joist supports, window arrangements and similar details. Or perhaps you have selected a certain house plan before purchasing your lot. Then you see a lot you are tempted to buy. This circle method will quickly indicate whether the house plan will fit the lot and, if so, how to place the house on the lot. It may show that the plan should be reversed from side



to side, or front to back. Or, perhaps you are planning to remodel your present home. The circles can be a great help in deciding where and how to change the rooms.

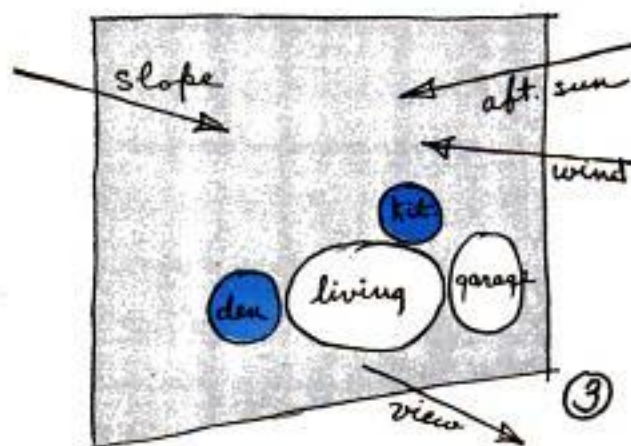
Let's take the common example of a suburban lot on an open hillside. First we draw our lot fair-sized on a sheet of paper, as in the above illustration. Next step is to spot in the basic features of this particular site, the things we cannot change now or later. So we draw an arrow showing the general slope of the land. The lot has an excellent view in a certain direction, so we indicate that important asset with another arrow. On a spring day we just can't find any defects in this pleasant site, but we have enough foresight to question some of the neighbors. We find that the afternoon sun can be very hot on this slope and that bedrooms facing the sun in some of the near-by houses do not cool off in summer until after midnight. That doesn't



sound so appealing. And we find that the prevailing wind is a problem on this open hillside, cooling exposed patios too quickly for leisurely summer dinners outdoors and rattling any exposed bedroom windows on winter nights. These are basic features which we can't change—though we may be able to counteract them—so we arrow in the wind and afternoon sun.

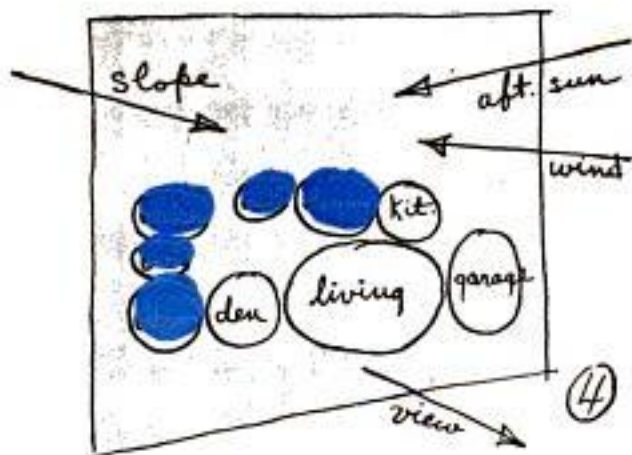
Now we can locate the rooms to fit this lot the way we want to live. Suppose, above all, we want the full beautiful view from the living room. In Fig. 2, let's indicate the living room with a circle placed toward the front of the lot and to the right, which is the view side.

The lot is high on the left side but just about at road level at the far right. By placing the garage there we would have a level driveway. We also note that the wind is from that direction and, as the garage makes a fine windbreak for any house, this



pretty well cinches the garage location. We place it a bit behind the living room to avoid blocking any view.

We've a yen for a den in our new home, and it, too, must have a view. So, in Fig. 3, let's put it alongside and a bit forward



of the living room. We want the kitchen facing a secluded garden patio. This will make it easy to serve some of our meals outdoors. We circle it in behind the living room, handy to the service area of the garage. It would be fine if the dining room, too, could open up on the patio. In Fig. 4 we place it alongside the kitchen where it will be accessible to both.

We circle in the bedrooms on the left side of the house, away from the sun, wind and household noises. We've decided to splurge a bit on a private bath for the master bedroom, so we place that so it will seclude the bedroom from the patio area. We place the other bath fairly handy to the den, so the den can be used as a third bedroom whenever we have overnight guests.

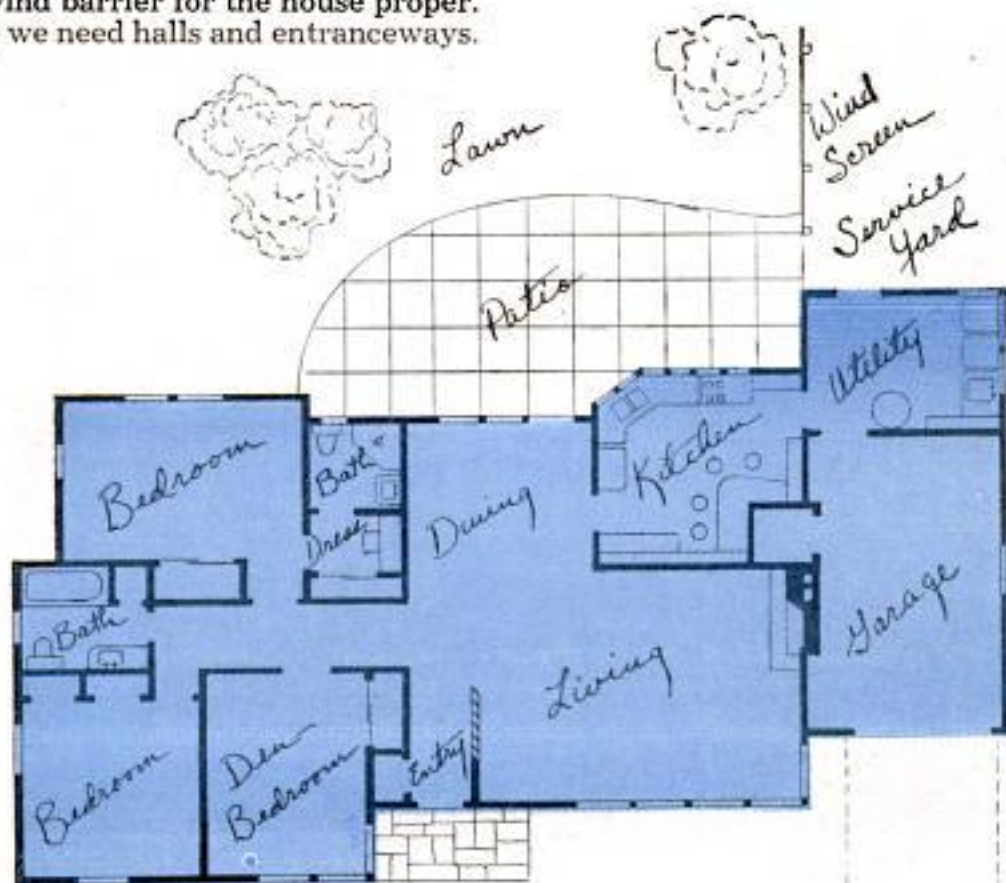
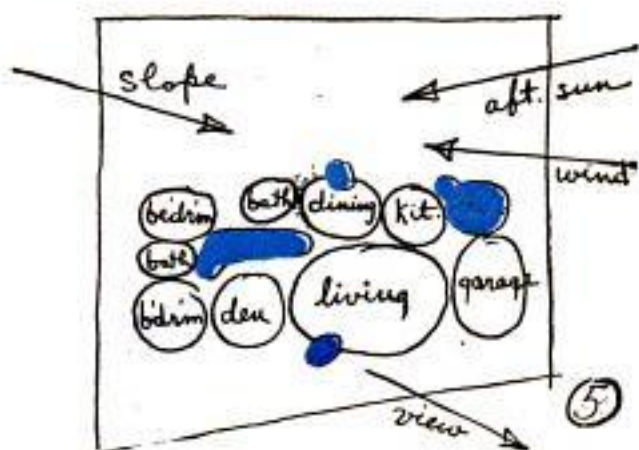
We want a utility room. Where? In Fig. 5, let's try it behind the garage. There it and its service yard will serve as a further sun and wind barrier for the house proper.

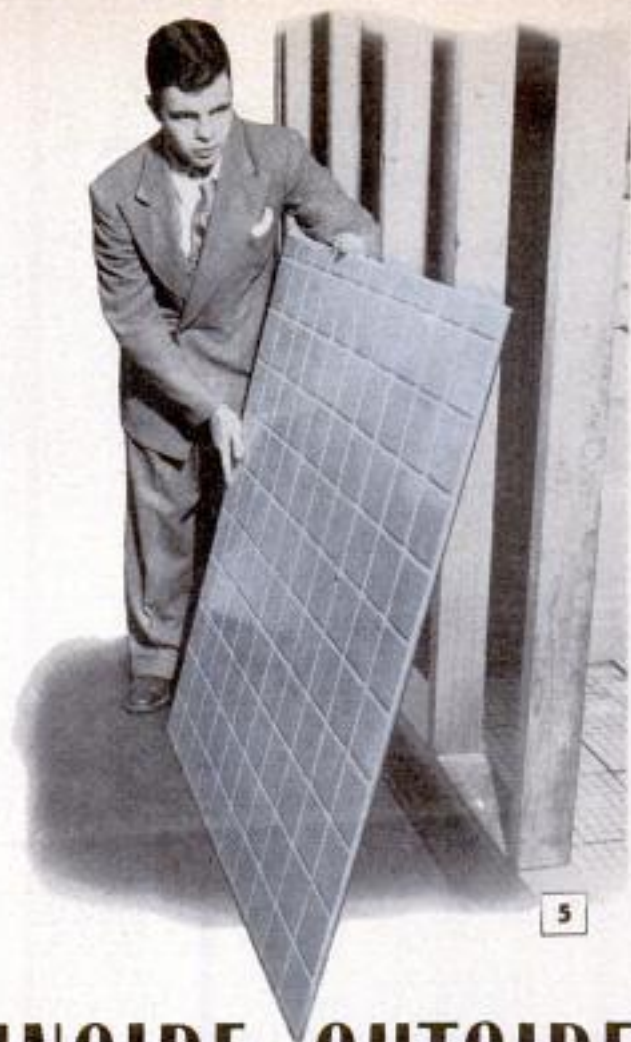
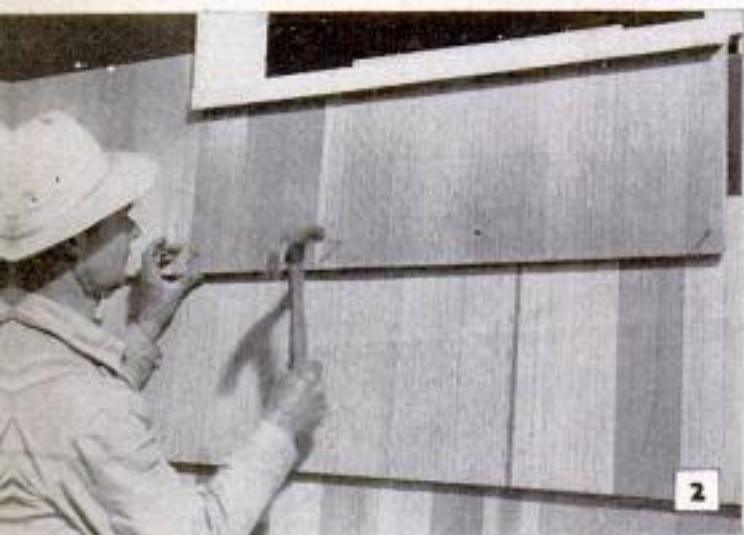
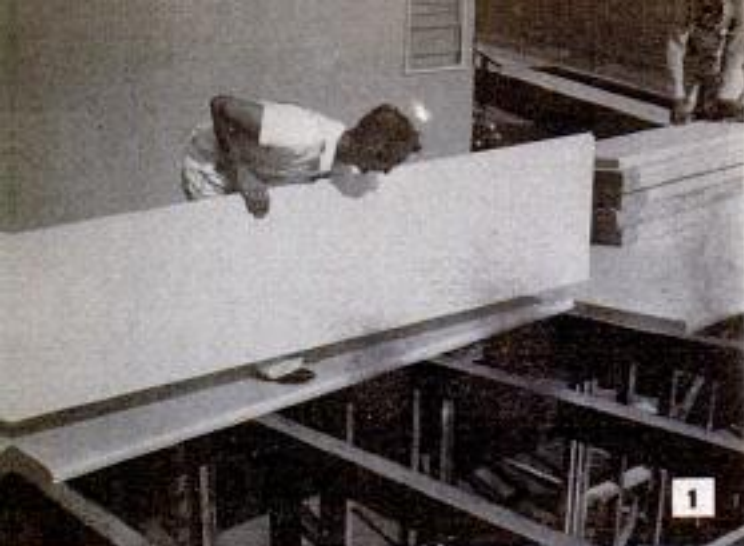
Finally, we need halls and entranceways.

We indicate them with small circles. Now our plan is complete and, without a confusion of details, quickly shows whether we've succeeded in joining the house and the lot.



Below is one of a number of floor plans that can be worked out for this one arrangement. The exterior of the house can be as modern or traditional as you wish. If you have a knack for drafting, you can work up the final floor plan yourself. Best of all, it will have no clash with the site. Perhaps you prefer to look among house plans for one that fits. Or even better, take your doodling to your architect—it will be invaluable to him. ★ ★ ★





INSIDE, OUTSIDE

1. ROOFING PANELS serve three ways—as roof sheathing, roof insulation and as a prefinished ceiling. Three men can lay 1000 square feet of the tongue-and-grooved panels in two hours. The material, suited for exposed-beam construction of low-pitched roofs, can be given finish of built-up pitch

Insulite, 500 Baker Avenue Building, Minneapolis 2, Minn.

2. SIDING PANELS eight feet long provide a cedar-shingle exterior, yet are quickly applied. The panels are laminated, with machine-grooved cedar shakes on the outside, veneer stripping in the middle and shingle undercoursing on the bottom. Panels give a heavy shadow line and have few exposed nailheads

Shake-a-Ply Company, P. O. Box 577, North Portland, Ore.

3. WIDE BRICK is a through-the-wall unit, needs no back-up materials. Coring holes reduce weight and facilitate handling. The brick is 2-1/6 inches high, 11 1/2 inches long and 5 1/2 inches thick. It enables a mason to lay more wall per day, is said to bring the price of brick down to that of frame construction

Structural Clay Products Institute, Washington 6, D. C.

4. GLASS BLANKET serves as an underlay for new siding on old buildings. Lightweight and resilient, the glass-fiber cushion acts as a heat barrier and is fire-resistant, rotproof and nonabsorbent. The easily applied material comes in 12 1/2-pound rolls 200 feet long, two feet wide and 1/2 inch thick

Owens-Corning Fiberglas Corp., Toledo, Ohio



AND ALL AROUND THE HOUSE

5. TILE PANEL, not yet in production, would slash the time needed to line bathrooms with genuine clay tiles. The large units can be installed easily by the amateur craftsman. Rutgers University's Tile Council Research Center developed the prefabricated panel, which may revolutionize use of the material

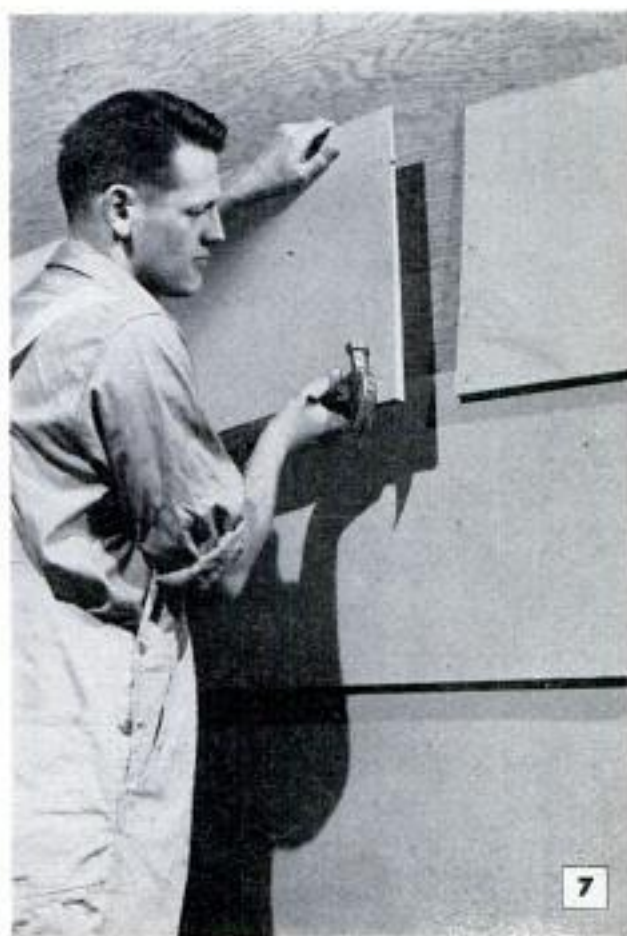
Tile Council of America, 10 East 40th St., New York City 16

6. CARPORT which doubles as patio shelter comes in kit form. Two men can assemble and erect the lightweight aluminum sections in a few hours. The W-shaped louvers keep out rain but allow the passage of air, diffused light, and smoke from a portable fireplace. Lustrous finish of shelter needs no paint

Kawneer Company, Niles, Mich.

7. PLYWOOD SIDING that is beveled for fast application requires no wedges at joints or edge-furring strips. A smooth resin-fiber surface bonded to the plywood provides a good paint base and gives protection against checking, grain raise, blistering or peeling. Deep shadow lines add to appearance

Walton Plywood Co., Inc., Everett, Wash.





He Builds a House in SECTIONS SECTIONS

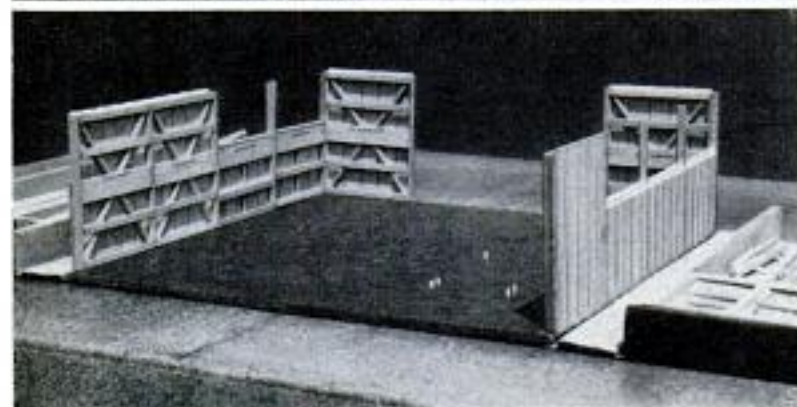
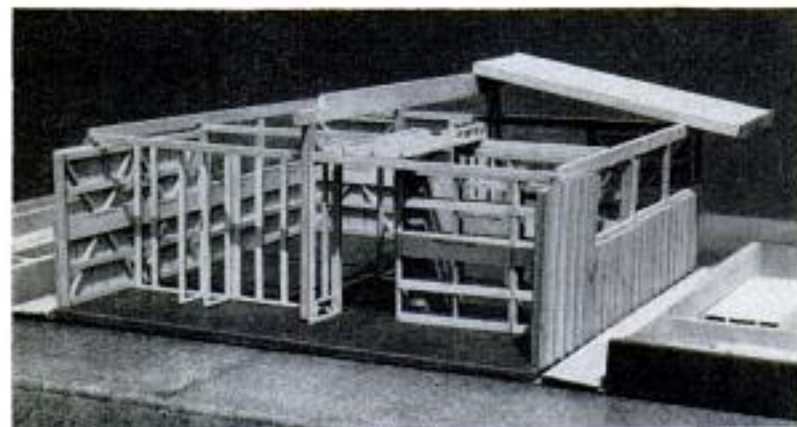
Cliff May demonstrates his patented sectional home which will fit many floor plans by juggling panels



Floor plan above can be varied depending on arrangement of the sections. None of the interior walls is load bearing. Below, exterior wall panels complete with posts go up first; then interior partitions. Below right, attractive bedroom is of ample size

HERE'S A LOW-COST HOUSE with two bedrooms that can be erected in a day, then completed for occupancy 17 days later. The design is modern with as much or as little glass as you want, and its prefabricated wall sections can be arranged to fit almost any floor plan you desire. Two thousand of the homes have been built so far and recently the demand has jumped to almost 10,000 units. The reasons are low cost and attractive design.

The house sells for about \$10 per square foot complete with land and financing. Cost of a single house is somewhat higher. On a tract basis the cost is less. One typical five-room house measures 22 by 38 feet exclusive of carport and contains 836 square feet of living area including a dinette as well as a dining area in the living room, and a full bath. The exterior is finished in wood siding, the interior in dry wall.





Prebuilt kitchen cabinet wall made of hardwoods is moved into a new May home



Interior view shows the effect of spaciousness achieved in a typical sectional house by the use of glass walls and doors

Interior partitions are preassembled and then erected on the job.

Designed by Cliff May, Los Angeles builder, and by Chris Choate, architect, the house is based on a post, beam and panel system of construction.

Three basic panels are used in the exterior walls: solid wall panels, window panels, and glass frame panels. Each panel is five feet wide and each has a 2 by 4 stud at either end. When the panels are erected side by side, the adjoining 2 by 4 studs become 4 by 4 posts that support the roof. The exterior wall panels go up first, then overhead cross beams and ridge-pole tie the structure together. The roof is made of plywood panels overlaid with roofing paper, tar and gravel. ★ ★ ★



Adjoining studs at ends of panels form post to support roof. Below, home made of same panels as model has different look



LOOK WHAT YOU CAN DO WITH DOORS



Panaview Co., North Hollywood, Calif.

A door the size of a glass wall is featured in this small home. It is framed in aluminum and the sill track is flush with the finished floor



Hough Shade Corp., Janesville, Wis.

This folding woven wood-fabric door for catchall closet saves space. It is made of basswood slats



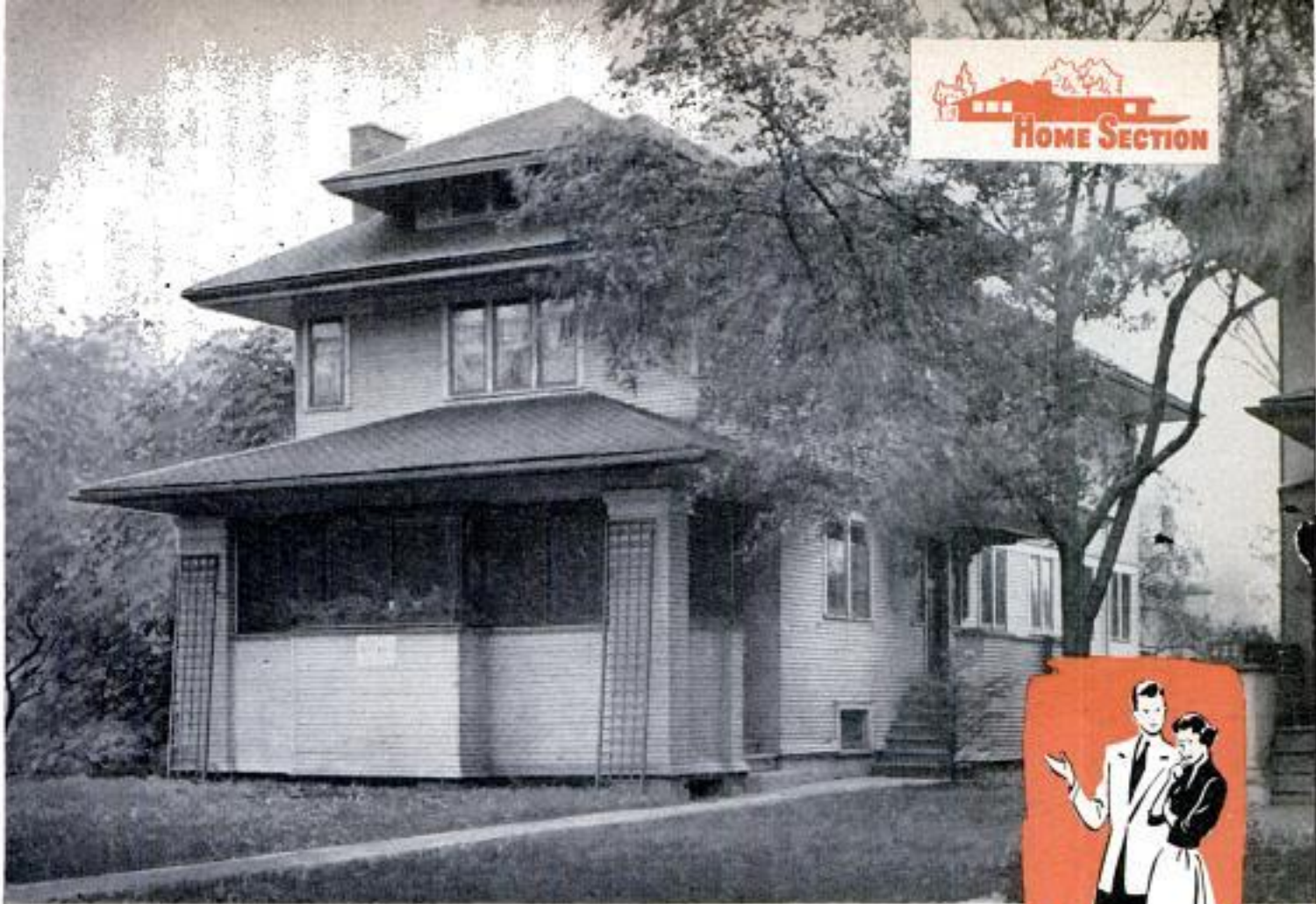
New Castle Products, New Castle, Ind.

Folding door with vinyl-coated fabric covering has balanced hinge construction, slides on metal track

Accordion-type wood doors separate living and dining room. They also are used in bedroom or kitchen
Bolscreen Co., Peella, Ia.

In tiny apartment, folding door of wood slats hides kitchen range and sink. It slides on overhead track





In this case, the answer to the title question is revealed by the photograph below

Is the Old Homestead Worth Saving?

By R. Kroger Williams

WHAT ARE YOU going to do about your old house?

Move out and leave its problem for someone else to worry about—or bring it up to date so it can serve you for years to come? Is it really worth any more time and money from you?

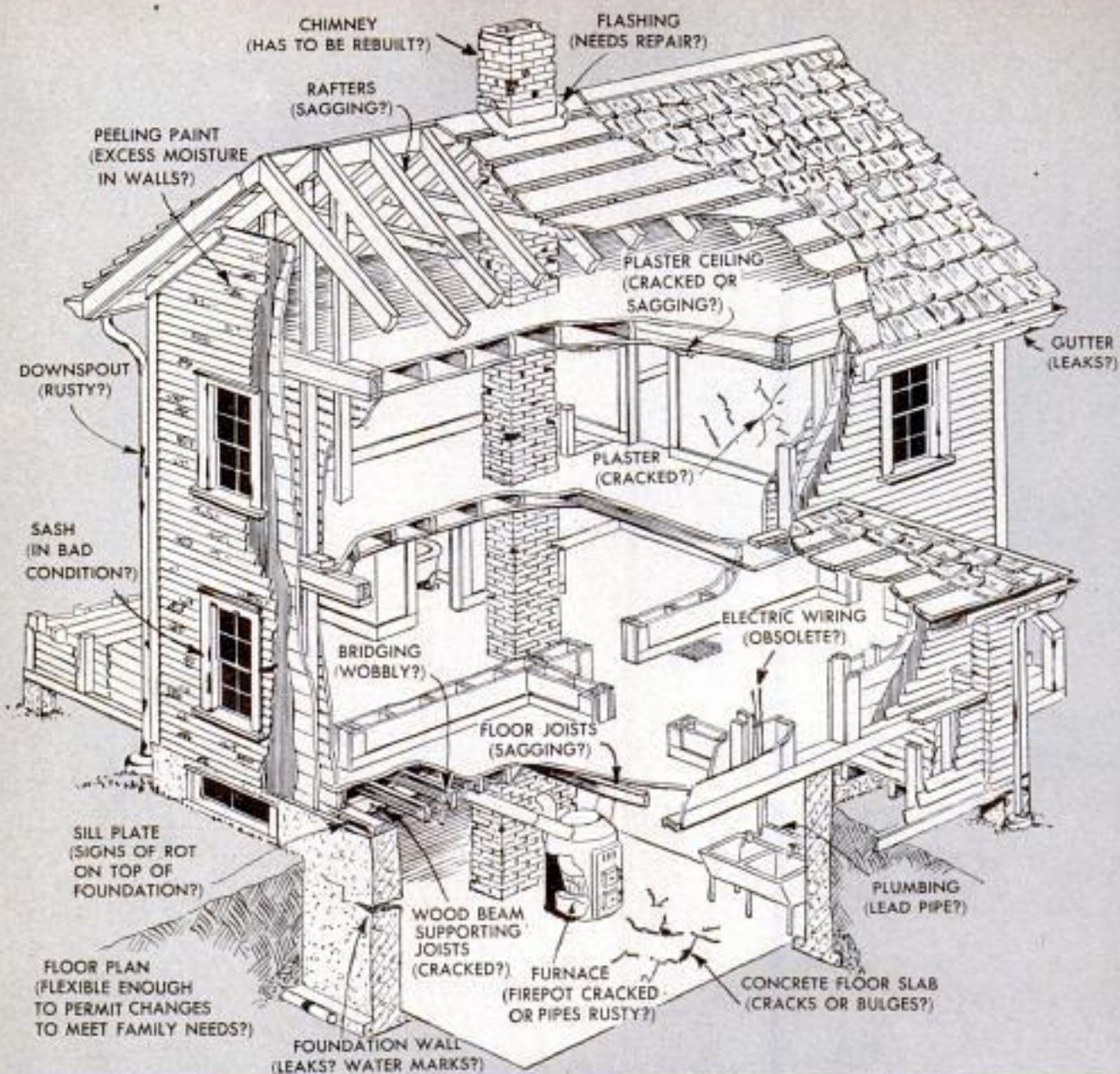
It's not easy to find a simple answer to that. So we called on an expert, W. Lockwood Martling, Jr., A.I.A., of Chicago and Oak Park, Ill. Mr. Martling is said to do as much remodeling designing as any other architect in the country. Because he also designs new houses, he can be impartial in helping owners decide on remodeling, building a new house or buying a ready-built one.

"Just how do you decide whether a house is worth remodeling?" we asked Martling.

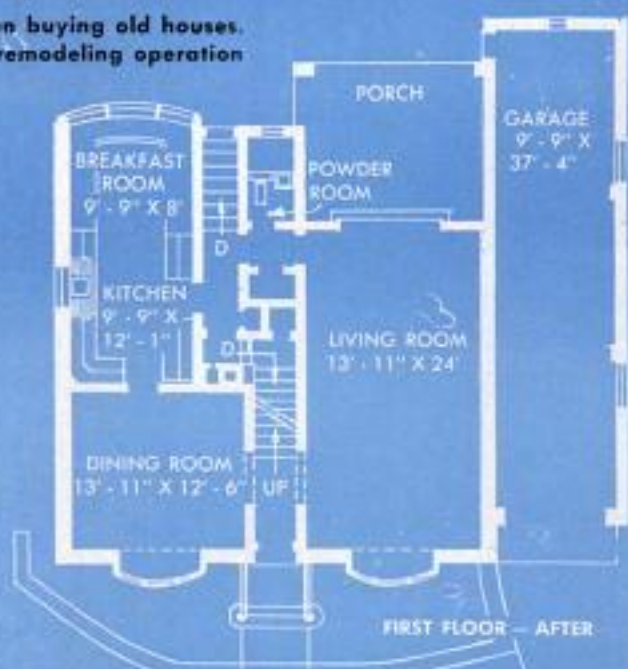
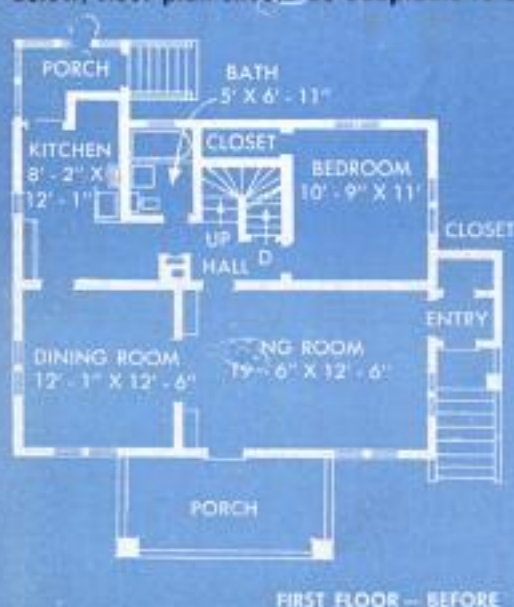
"Do you use a check-list, or do you have

With the old front porch, wide overhang and front gable gone, this home is hardly recognizable as the same basic house at top of page. Major improvements were big window and main entrance moved to side





Cutaway above points out defects to look for when buying old houses. Below, floor plan should be adaptable to unified remodeling operation



some tests you put it through?"

"Yes, there are tests, not only for the house but for the family that's going to live in it. These can be boiled down pretty well into six major parts: (1) Location of the house; (2) structure of the house; (3) flexibility of present floor plan; (4) economics of the remodeling; (5) preferences and needs of occupants, and (6) esthetics of the remodeling."

Martling illustrated these points with parts of several typical houses, choosing features common to many average homes in average communities. We will discuss these features as parts of one composite house.

Location. The typical house was in a good, upper middle-class neighborhood, with young to middle-aged couples and young or teen-age children. No neighboring slum areas or near-slum areas were present or anticipated for many years. This old house was near churches, schools, shopping areas and excellent transportation, all important factors.

Structure. The house was structurally sound. Martling studied the foundation for major cracks or signs of water leakage and found none. He looked at the wood posts supporting the main bearing walls and found them free from decay at the bottom where they touched the concrete. They did show some cracking and splitting but, unless so great as to indicate weakness, this is a natural condition in solid wood timbers in any old house.

When Martling described this "house test," he told the story of another old house he had recently studied. He noticed considerable sagging of the floors in this house. Some sagging is almost inevitable in an old house, but this was so pronounced that he was sure it indicated some structural weakness.

When the architect examined the wood supporting posts in the basement, they appeared, at first glance, to be sound.

But a closer examination proved them to be anything but that. The former owners had merely boxed in these posts, creating a false front to conceal a serious condition. Termites had eaten away the supporting posts and the sagging floors were supported only by the covering timbers.



Before and after photos of a kitchen show what can be done (above) with a room that originally had "a place for nothing and nothing in its place" (below). Good planning of units makes space for dining alcove





Changes above do not affect basic structure of remodeled home

span for their size and spacing. There should be adequate bridging between the joists to serve as reinforcement.

If the basement has a plaster ceiling, check it for cracking. Series of cracks running parallel to the main structural beams reveal weakness of the basic structure. In such a plaster ceiling, punch a small hole in some inconspicuous spot so that you can find out the size and spacing of the beams.

While checking the basement, take a look at the electric wiring. Is it old, outmoded, exposed wiring, or the newer, more desirable wiring, properly enclosed in insulated covering?

Look at the piping for the laundry tubs. If this is lead piping, chances are the entire house has similar lead piping which may have to be replaced to avoid leaks and expensive repairs.

Check the heating plant to see if the firepot is cracked or if the piping is rusted, or for other obvious defects.

Next, check the walls and floors of the rest of the house. Don't expect all floors to be true and level, but do be on guard for excessive sagging, as mentioned before. Some plaster cracking is to be expected but, again, not an excessive amount.

The same yardstick applies to the exterior, if it is stucco. Only large deep cracks are important. However, the architect warned that the same reasoning does not apply to frame houses. Chipping or

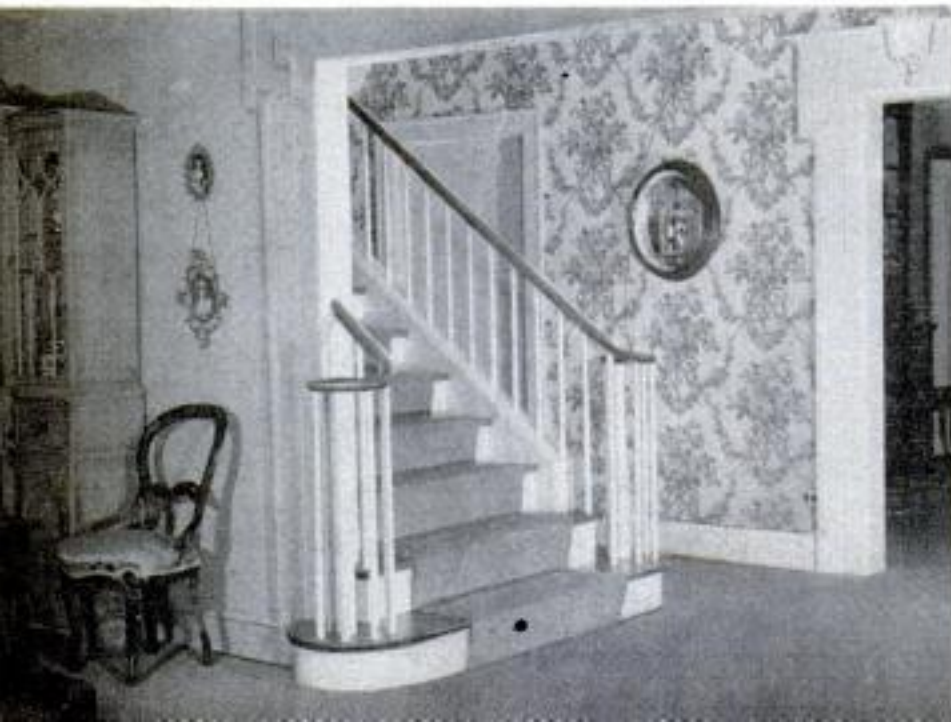
• (Continued to page 270)



Martling warned about cracking or splitting along the lower edge of beams. This indicates definite overloading. He also suggested looking along the top of the foundation, where the plate rests, for signs of rot.

He suggested sighting along the joists to see if they are straight. Sagging may mean too great a

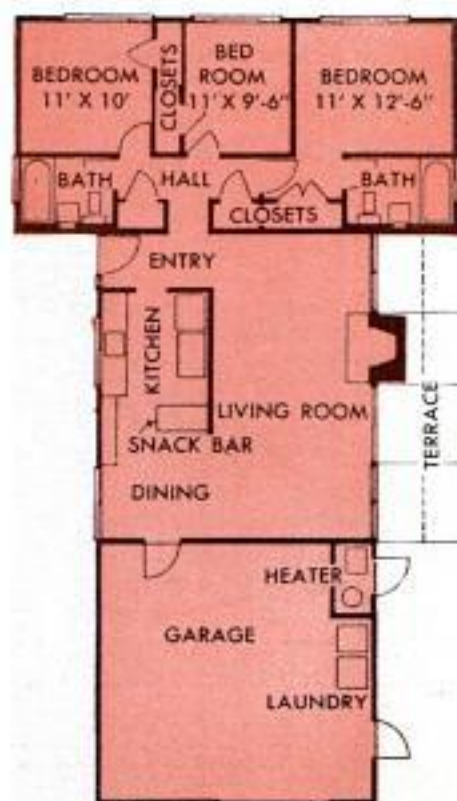
Simple remodeling job (below left) changes a dreary entrance hallway into a place of real distinction





HOUSE FOR A NARROW LOT

DESIGNED for the 50 by 100-foot lot, this house has a two-car garage facing the street, three bedrooms and two baths at the back and the living room opening onto a side terrace. There is also a back yard. All of the walls are wood-paneled and the ceilings are beamed. Floor-to-ceiling glass walls and sliding glass doors are featured. Work space is available in the garage which also houses laundry and heater. The house is radiantly heated. This 1118 square-foot house was designed by Anshen & Allen of San Francisco and constructed by Eichler Homes of Palo Alto. It sells for \$13,950 in the San Francisco area, including lot, range and ventilating fan.



HOW DO YOU WANT IT DELIVERED?

Your answer to this question will decide what kind of a house you want: (1) precut, (2) prefabricated or (3) standard construction assembled on the site



Swift Homes Inc., Elizabeth, Pa.

PLANNING TO BUILD today? You will find yourself choosing one of a variety of delightful styles of new homes. You'll find you can also choose one of three construction methods: Prefabricated, precut or standard construction. In quality, you will find there is little difference today—you can have a cheap house, a good economical home or a very expensive home by any of the three methods. The major difference and the advantage of each are derived from the way the house is delivered to your building site.

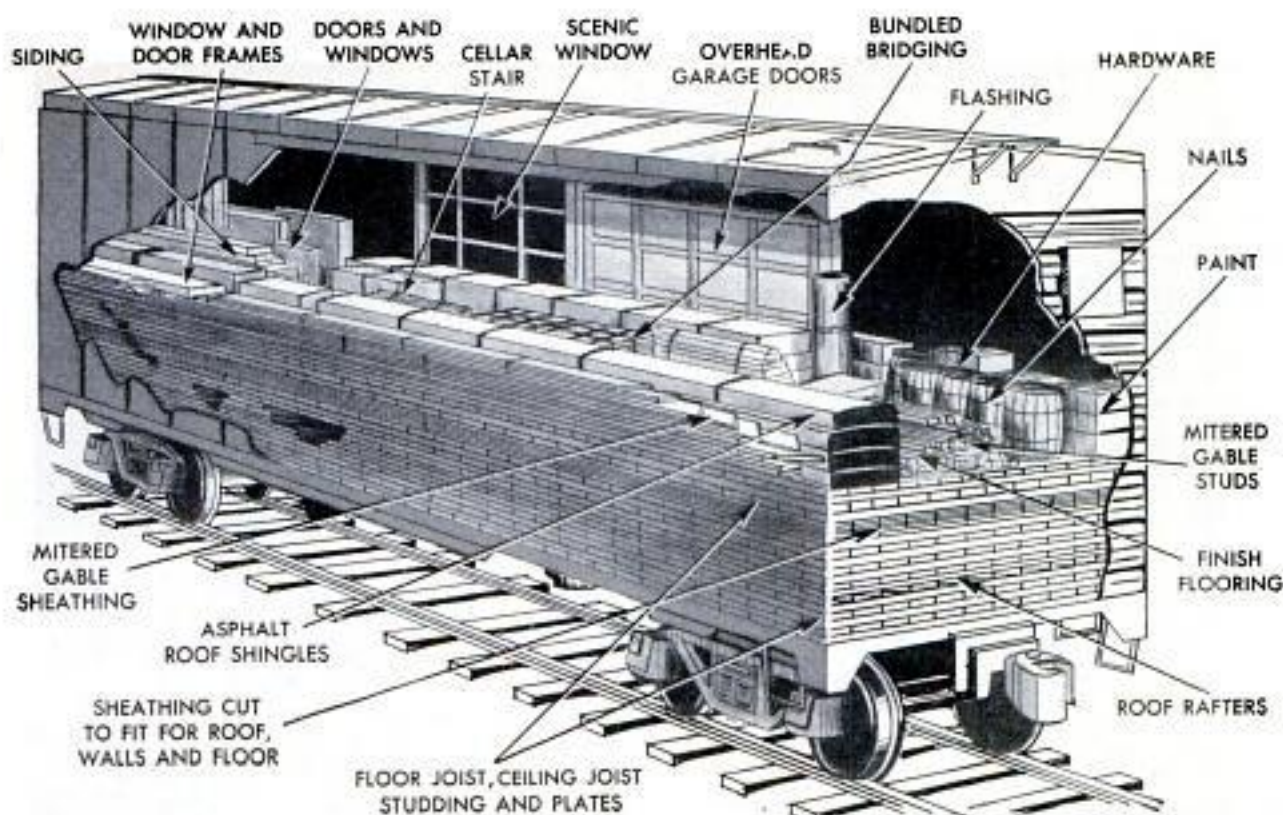
If you build by standard construction, your materials will be delivered from one or more local lumberyards and in any dimensions desired. Thus you are not limited

to any certain house plan and your home can be tailored to fit your particular lot and needs. If you live where building materials are comparatively cheap, you or your contractor can take advantage of local lumber sales, especially if you build in the winter when prices are often less.

If you order a precut house, all of the materials including lumber, hardware, nails, roofing and windows will be delivered in one "package." In case you live in an area where the cost of materials is high, you can obtain a good saving through the precut factory's purchase of materials in huge lots. The boards will arrive cut to size, eliminating waste and up to a claimed 20 to 30 percent of the skilled labor at the

This is the way a completed wall section of prefabricated home is unloaded onto the slab foundation
Harnischfeger Corp., Port Washington, Wis.





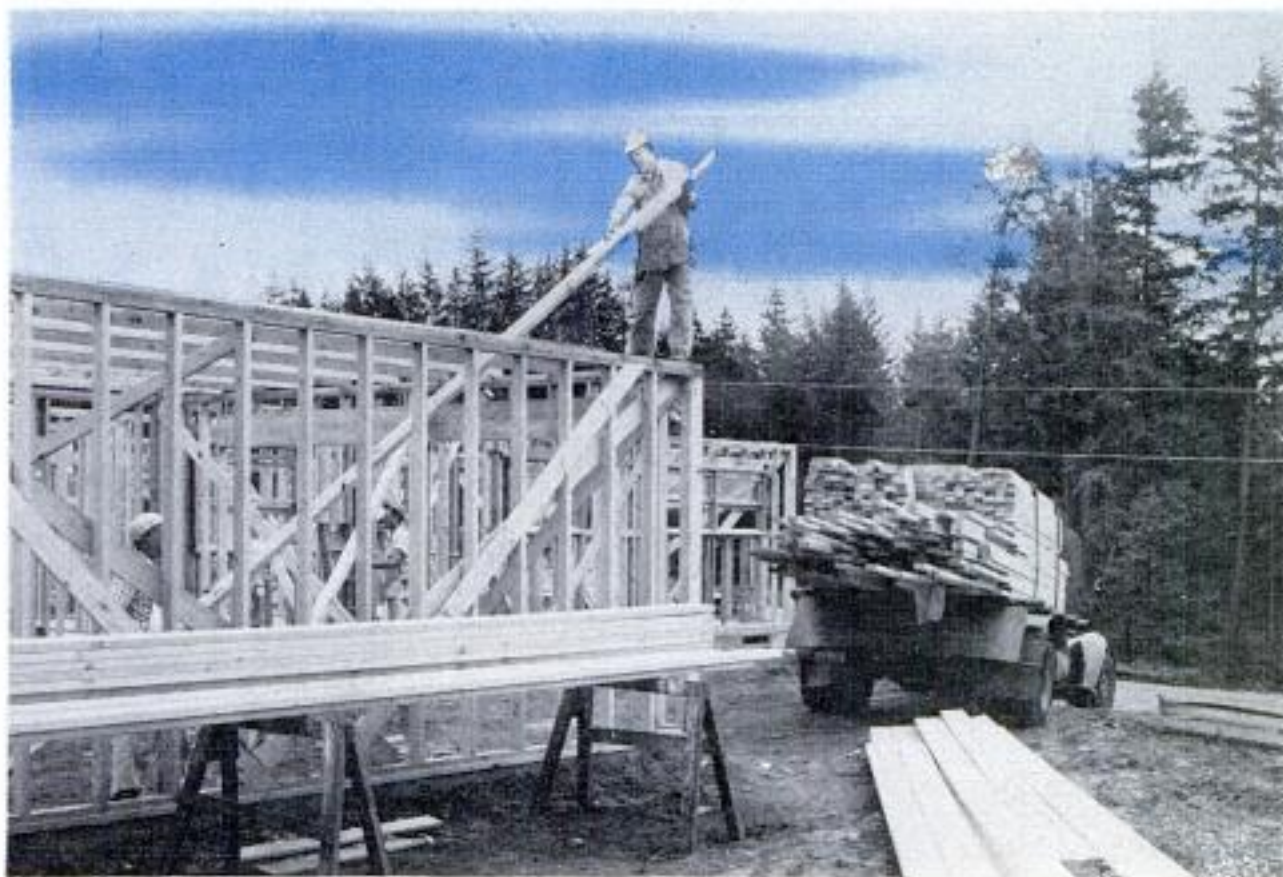
Aladdin Co., Bay City, Mich.

Cutaway of this boxcar shows the complete materials for one pre-cut house carefully packed for shipment

site. When you plan to do a good part of the carpentry yourself, the pre-cut package offers other advantages. The plans are quite complete and each board is numbered. The parts will fit. Also, the parts are all there—you spend your time building, not shopping.

The cost of a prefabricated house delivered at your lot is much higher than that of a pre-cut. However, the prefab arrives at your lot close to completion and many prefab manufacturers will deliver laundry and other appliances along with the house at big savings. ★ ★ ★

Scene of a standard-construction job—uncut lumber and other materials are delivered by local dealers



SPOTLIGHT

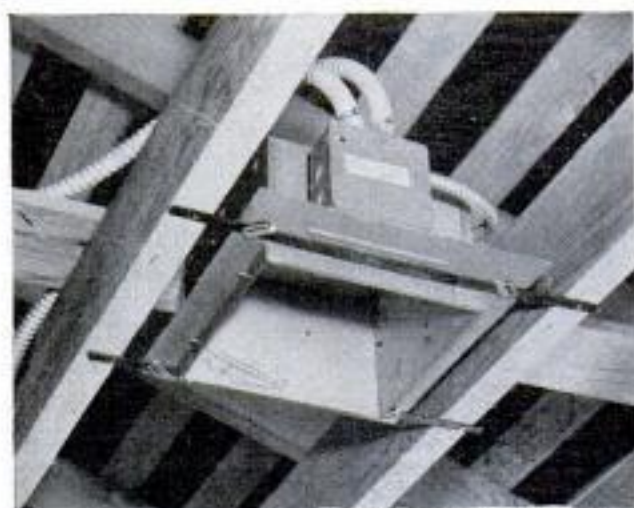


ON FLUSH LIGHTING

MANY A HOUSEWIFE who thinks her kitchen is completely modern would be amazed by a lighting expert's appraisal of her old-fashioned fixtures. In today's new and remodeled homes, cabinets, cupboards and major appliances are built-in to eliminate broken lines and do away with dust-catching surfaces. This idea is equally applicable to lighting; but only the most progressive homeowners take it into account, probably because the average person is not familiar with the remarkable advances that have been made in the designing of recessed or "flush light" fixtures.

Flush lights offer not only great variety in appearance and use, but they can be combined with recessed heating and ventilation units. Because they have no protruding surfaces to gather grease and dirt, they are more easily cleaned and maintained. Despite their streamlined design, there are models to harmonize with all types of furnishings.

The single unsatisfactory feature of recessed lights used to be that they did not light the ceiling like more conventional fixtures. However, a new prism-lens, pyramidal-reflector unit solves this problem. It illuminates the ceiling and provides even distribution of light at floor level, yet gives no objectionable glare at the "approach angle" or line of vision when you are looking at the light from either a sitting or standing position. Most of the light is directed toward the floor, but a series of prisms arranged around the fixture's outer edges reduces the amount of light issuing at the approach angle and bends some of the rays upward toward the ceiling. A modified model for corridors has an asymmetric lens which directs the light length-



Fryne & Co., Pomona, Calif., photo
Top, even the inside of the lens on this flush light can be cleaned without removing the fixture frame. Mounting strips on lights make installation easy

wise without excessive glare on the walls.

The new flush lights are easily installed in old or new construction. No framing-in is necessary and built-in junction boxes are accessible from either side. Recessed lights may be lamped from above or below, are prewired for use with any standard building wire and, with mounting strips provided, there is no need for extra help or awkward, dangerous contortions to fasten a fixture into position. The snap-up lens frames can be raised, lowered or removed for inside cleaning and come in several different finishes.

In addition to ceiling installations, flush lights lend themselves well to wall use, particularly for lighting stairways or as night lights in hallways. Because none of them drops more than two inches, they make any room appear more spacious and add the modern touch that is often missing from the so-called modern home.



**MODERNIZE YOUR HOME WITH
TRANSLUCENT
PANELS—A NEW
WOVEN-GLASS BUILDING MATERIAL**

By Wayne C. Leckey

IT LOOKS like glass and it feels like glass, and you would think twice about sawing and drilling it like a piece of wood. But the homeowner can do just that in working with a new translucent plastic sheeting that contains some 25 percent glass.

Glasslike, yet shatterproof, this colorful, do-it-yourself building material has unusual structural strength for its seemingly fragile thickness. Being translucent, it lets in an abundance of diffused sunlight, is fire-resistant, and has great decorative value.

Often called "glass-fiber panels," the material consists of polyester resins reinforced with a core of fibrous glass. The result is a lightweight, durable plastic sheeting that can be sawed, drilled, nailed and screwed—all with common hand tools. Originally designed as a roofing material to match the corrugations of sheet metal, the material has found wide usage both inside and outside the home.



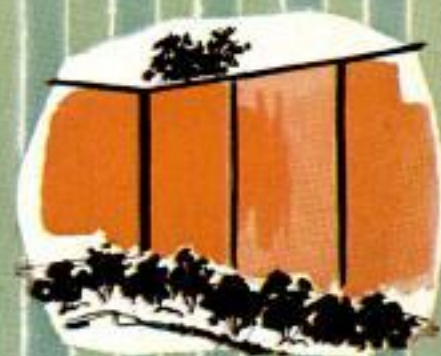
PARTITIONS AND SCREENS



AWNINGS AND CANOPIES



GARAGE DOORS AND GATES



FENCES AND MOVABLE SCREENS



Alayrite Company of America photo

Above, offering amazing structural strength for its seemingly fragile thickness, translucent plastic is extremely lightweight, requiring minimum support

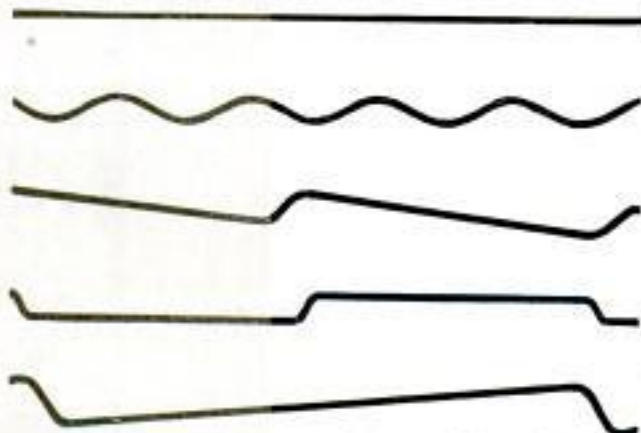
Below, colorful, glasslike translucent panels are ideal for tub and shower-stall enclosures; will not warp or crack and are not affected by heat or cold

Libby-Owens-Ford Glass Co. photo



Where can these translucent panels be used? They can give an open flagstone terrace a "skylight" roof to keep the sun and rain out and let diffused light in so inside rooms are not darkened. The material is perfect for making your own permanent window awnings and door canopies, requiring a minimum of framing. Patio screens which let the light in without sacrificing privacy, and sun-and-wind shelters are among other outdoor uses. If you are planning to build a garage, a panel or two of this translucent material can be used in the roof as a skylight. Full-length "windows" can be installed in the walls of the garage, and it can be used as a facing in making an overhead door. It simplifies the roof

TYPICAL SHAPES AVAILABLE



Some Typical Uses for Translucent Plastic Panels

- | | |
|---------------------|-------------------|
| Awnings | Office Partitions |
| Barbecue Walls | Patio Enclosures |
| Bathtub Enclosures | Porch Glazing |
| Breezeways | Quonset Windows |
| Cabanas | Shower Doors |
| Canopies | Shower Stalls |
| Carports | Sidewall Lighting |
| Ceilings | Signs |
| Counter Fronts | Skylighting |
| Display Advertising | Snack Bars |
| Fences | Store Fronts |
| Garage Doors | Sun Shelters |
| Garden Walls | Transoms |
| Greenhouses | Windbreaks |
| Lighting Fixtures | Window Trimming |
| Movable Screens | |
| Neon Signs | |

Right, colorful plastic panels make smart-looking partitions and room dividers for both home and office. Below, curved corrugated panels provide portable sun-and-wind shelter

Akynite Company of America photo





Plymolt Corp. photo

Above, deck covering over patio is popular use for colorful plastic panels due to their translucence. Photos on opposite page show how material is applied to "egg crate" framework in making this installation

Below, attractive basket-weave screen shows what can be done with flat strips of plastic to add privacy to your yard. Plastic is woven in and out among wooden poles spaced vertically in rock-terraced fence

Plexolite Corp. photo



of a carport. On the inside of the house, several panels placed vertically or horizontally in a wooden frame make a smart-looking divider in a combination living and dining room.

The panels have particular value in a home greenhouse, both for their strength and shatterproof qualities, as well as for their optical properties which admit light rays that stimulate plant growth. Set vertically, the panels produce an attractive planter background. Tub enclosures and shower-stall doors are additional uses. Commercially, the material has unlimited applications.

Colors and shapes to be had: Produced by some 16 manufacturers, translucent panels are available in a number of standard and special colors to blend with any color scheme. The panels come in several differ-



Above, V-shaped posts of 2 x 6 which support front corners of "egg crate" roof, are anchored to patio with bolts embedded head-downward in holes drilled in the concrete



Upper right, where necessary, translucent plastic panels are easily cut to size with an ordinary handsaw. Abrasive wheel is recommended when an electric handsaw is used

Right, regular porch roof over this big picture window would darken room. Not so with translucent plastic; it lets the light in. See color transformation on opposite page



Plymold Co. photos

Below left, "egg crate" roof partially covered. Mastic strips are laid between overlapping edges of panels to seal the joints and thus prevent moisture and dust leaks

Below right, "feather light" material permits easy handling. Large 12-ft. sheets, 26 in. wide, weigh approximately 12 lbs. Standard lengths available are 8, 10 and 12 ft.





International Molded Plastics, Inc. photo

Left, tinted panels placed horizontally make smart-looking wall inset that blends well with modern decor



Screw it!



Hammer it!



Saw it!

ent shapes as shown on page 182. These include flat, corrugated, large and small shiplap and board-and-batten patterns. Corrugated is the most widely used as it seems to be the most generally available. In most cases, the flat type is available on special order, as are curved sheets for Quonsets, sunshades and the like. Average thickness of the material is about $\frac{3}{16}$ in., although this varies somewhat among different brands. Extra-heavy, $\frac{7}{32}$ in. thick, is designed for shower doors and bathtub enclosures. As thickness varies, weight does likewise. Average weight of the material is from 7 to 8 oz. per sq. ft. This "feather" lightness permits ease of handling and is especially advantageous where the assistance of the woman of the house might be needed in roofing a carport or a patio shelter. A new woven-texture panel, designed primarily for interior decoration, weighs but 4 oz. per sq. ft.

Standard sizes offered: Translucent plastic panels are sold in 8, 9, 10, 11 and 12-ft. lengths. Some manufacturers also offer them in 4, 5 and 6-ft. lengths. Corrugated panels come in various widths, 24, 26, 30, 36, 40 and 42 in., depending on the particular size of corrugated pattern selected. Corrugations that measure $1\frac{1}{4}$ and $2\frac{1}{2}$ in. wide are more or less standard, although panels of larger corrugations are to be had. Exact measurements vary with the different brands as you will notice in reading the data supplied by the various manufacturers.

Working with translucent plastic: Although they contain glass, some 2 oz. per sq. ft., translucent plastic panels can be cut easily with an ordinary handsaw. However, when using an electric power saw to cut the material, it is recommended that the saw be equipped with an abrasive-type wheel or a metal-cutting blade having fine teeth and no set. Flat-type panels can be cut with ordinary tin shears. A grease pencil is ideal for marking the plastic for cutting. In many cases, installations can

Libbey-Owens-Ford Glass Co. photos



Drill it!



Libbey-Owens-Ford Glass Co. photo

be planned so that no cutting is required. A patio roof, for example, can be designed to make use of standard-length panels.

While a nail can be driven through the material, it is best to drill pilot holes before nailing or screwing the panels in place. In the case of the latter, the holes should be slightly smaller than the screws being used to avoid a slight surface cracking that takes place when the screws are driven home. An ordinary brace and bit can be used to bore the holes if you do not have an electric drill, and it is best to back-up the material while applying pressure with the drill. While home application generally involves fastening the panels to wooden supporting members, the plastic may be bolted to any type material. When using stove bolts, roundheaded screws or nails, a $\frac{3}{4}$ -in.-dia. soft-rubber or Neoprene-gasketed washer is used under the head of the fastener to form a watertight seal. In the case of nailing, a "shock area" approximately $\frac{1}{8}$ in. around the nail hole will occur. This, however, is to be expected and does not harm the material. Whatever type of fastening is used, it should be rustproof—aluminum, galvanized or cadmium plated—to eliminate rust stains on the plastic.

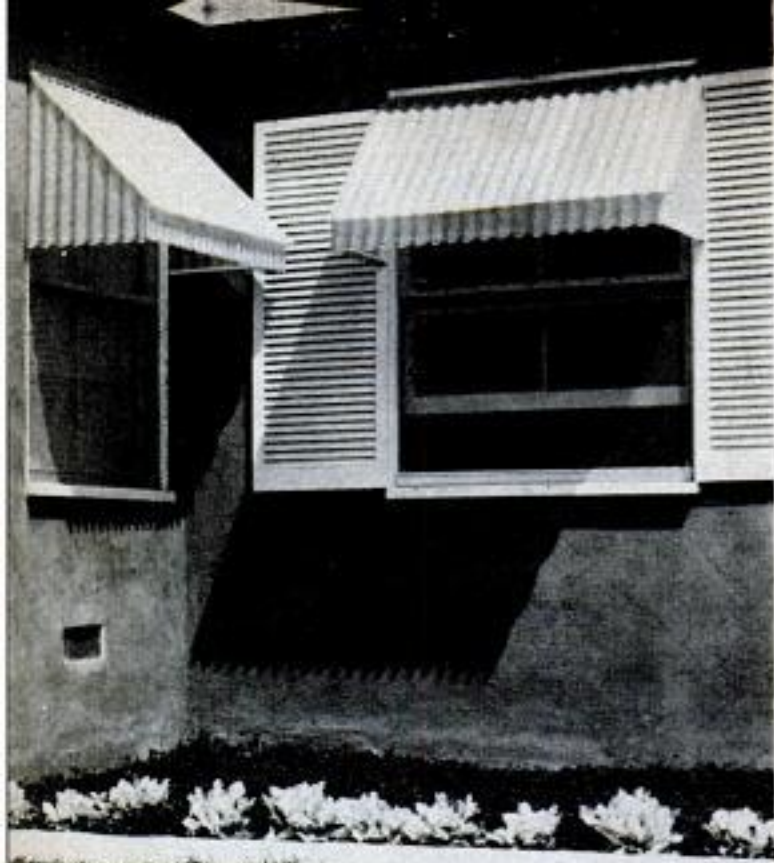
Rafter spacing and cross bracing: In roof framing particularly, correct rafter spacing

Above, new woven-texture panels form an attractive background-wall for indoor planter. Material transmits light freely, but screens vision. Weighs only about 4 oz. per sq. ft.; comes in fine and bold weave

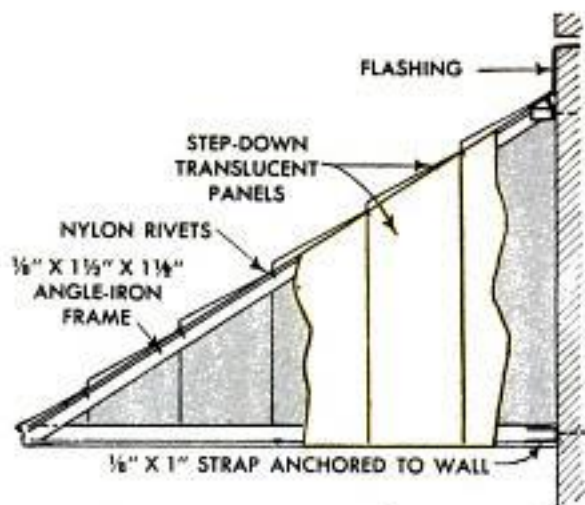
Below, shatterproof translucent panels are ideal for glazing windows of greenhouses and cold frames

Alsynite Company of America photo





Ripplite Plastic Products, Inc. photo
 Above, colorful and permanent awnings of translucent plastic keep strong sunlight out, let soft light in



is important to assure adequate nailing support at all seams. A rule of thumb to follow in almost all cases is that the center-to-center spacing of the rafters should be 2 in. less than the width of the plastic sheeting to be used. For example, panels of 26-in. material, having 2½-in. corrugations, must be supported by rafters set 24 in. on centers. No cross bracing is required in the roof framework for 26-in. panels 10 ft. long and under. Where 12-ft. panels are used, cross braces should be added and spaced 6 ft. apart. For 34-in. panels 10 ft. long, the cross bracing should be placed at 5-ft. intervals; 6 ft. for 12-ft. panels.

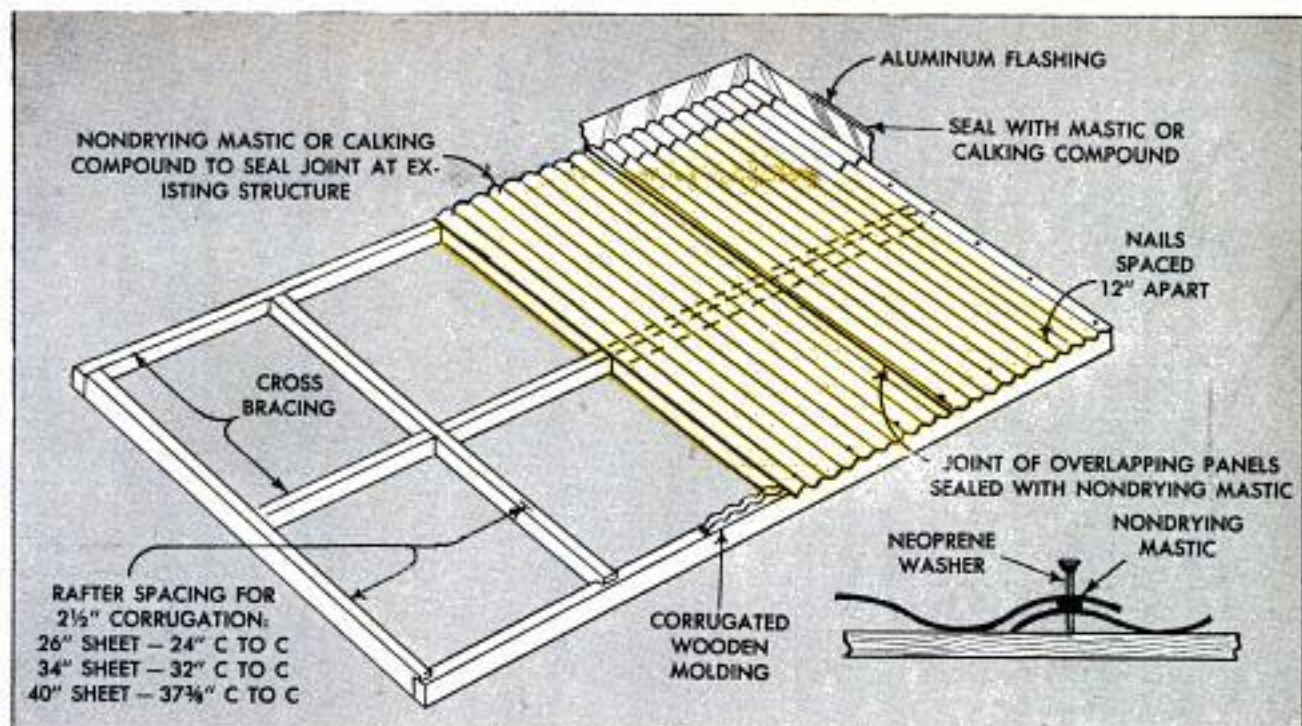
Typical patio installation: The drawing on the opposite page details construction of the roof framework for a typical patio or carport roof and shows how the plastic sheeting is applied. The over-all size of the framework is determined by the size of the individual panels used. Where the length can be made a multiple of several sheets, cutting is eliminated entirely and the job is greatly simplified. The depth of the framework should be an inch or so less than the length of the panels to provide a drip edge along the front. After the rafters and necessary cross bracing are in place, special corrugated wooden molding is nailed along the front and back edges of



Alpyrite Company of America photos
 Above, flat-type translucent plastic may be used in place of regular frosted glass where vision is not desired. Below, panels of corrugated plastic, 10 or 12 ft. long, simplify construction of a carport roof

Below, built-in skylights that can be nailed in place, are easily installed in corrugated sheet-metal roof
 Libbey-Owens-Ford Glass Co. photo





the framework to close the openings formed by the corrugated shape of the panels. The use of the molding can be looked upon as being optional, although it produces a much better job.

Now you are ready to apply the plastic panels. A calking compound or similar mastic is used to seal the roof where it joins the wall of the house. Apply it liberally along the corrugated wooden molding. Each sheet laps the other by one corrugation and to seal these seams, a non-drying mastic is applied to the edge along the full length of the panel. Apply the mastic carefully to assure a positive watertight seal. Next, lay the edge of the adjoining sheet in

the mastic. Special aluminum nails with Neoprene washers under the heads are driven through the crown of the corrugation, through both thicknesses of plastic and into the framework. Nail holes should be predrilled and spaced a minimum of 12 in. In an installation where it is necessary to lap the panels endwise, special mastic strips are laid between the lapped edges. This particular mastic comes in strip form in 20 and 80-ft. rolls. Here the ends of the panels are nailed as before into the cross bracing. Aluminum flashing along with mastic is finally applied so that it laps the plastic panels where the roof joins the wall of the house. ★ ★ ★

Plastic Liner Protects Bottle From Frozen Washer Solution

A broken windshield-washer bottle—caused by an early winter freeze coming before you have time to change to an anti-freeze washer solution—can be prevented by installing a flexible-plastic liner in the jar. Plastic containers, such as are used to store fruit juices in the refrigerators, are obtainable in a number of sizes that will fit inside the washer jar. The container used in the photo measured $4\frac{1}{4}$ in. at the large diameter by $7\frac{3}{8}$ in. high. The lid, of course, was discarded. To prevent the solution from splashing over into the space between the plastic container and the jar, fill the container only about $\frac{3}{4}$ full.

Ben Quan, Ottawa, Ontario, Can.

☐ When the cloth lining in a spectacle case becomes worn, a pipe cleaner may be used to pad the glasses. Just curl the ends of the cleaner and tape it to the bottom of the case.



NEW FACES For Old Homes

By W. Clyde Lamme

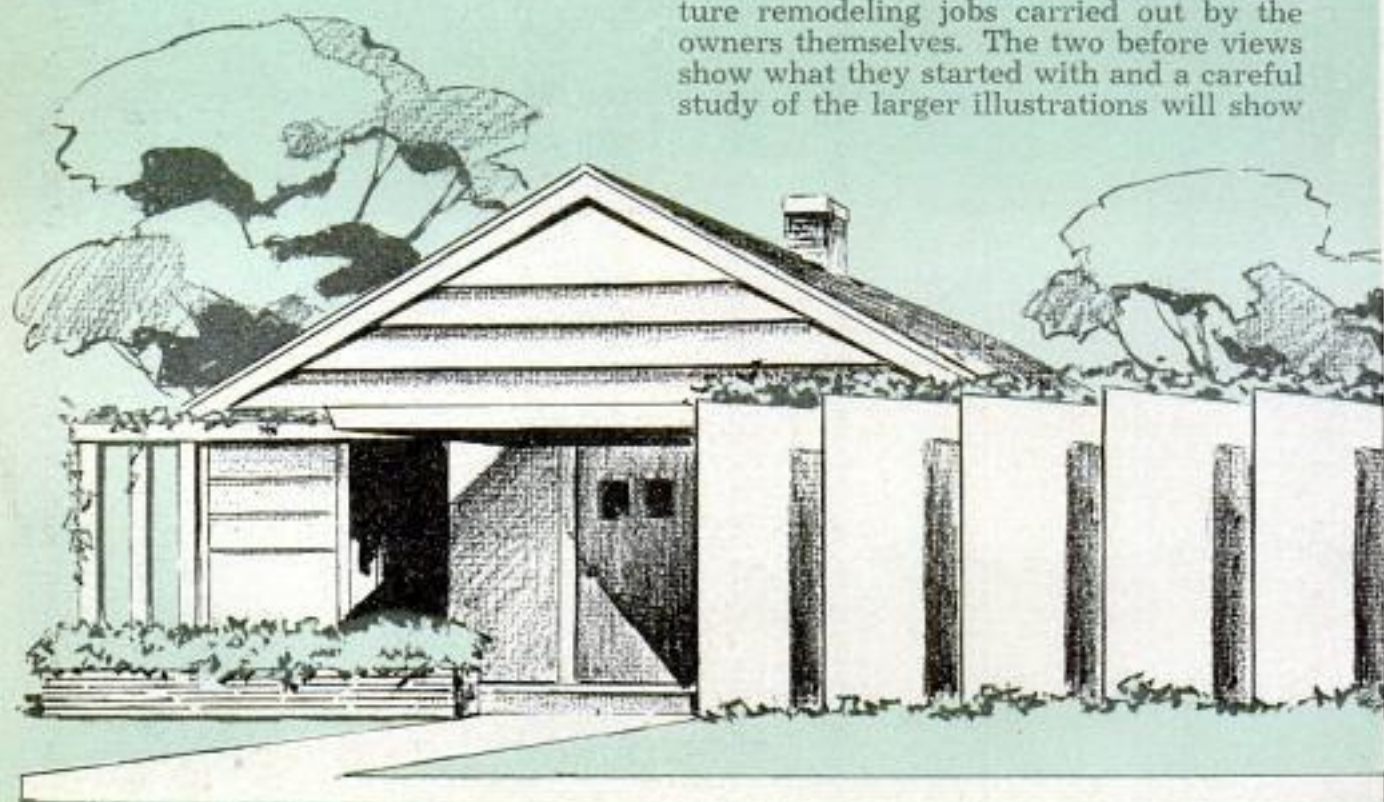
BBETTER LIVING need not mean selling the old house and buying or building a new one. Present-day prices and building costs can dim a lot of new-home dreams when you get around to putting the figures down in black and white. Take another good look at the house you live in before you make any decision. Add up the floor area and then compare with present costs for rooms of the same size at \$10 to \$20 a square foot. You may be in for a surprise. It could be, on the basis of this simple calculation, you will decide that while the interior is passably comfortable and livable as it is, the exterior could be a lot easier to look at.

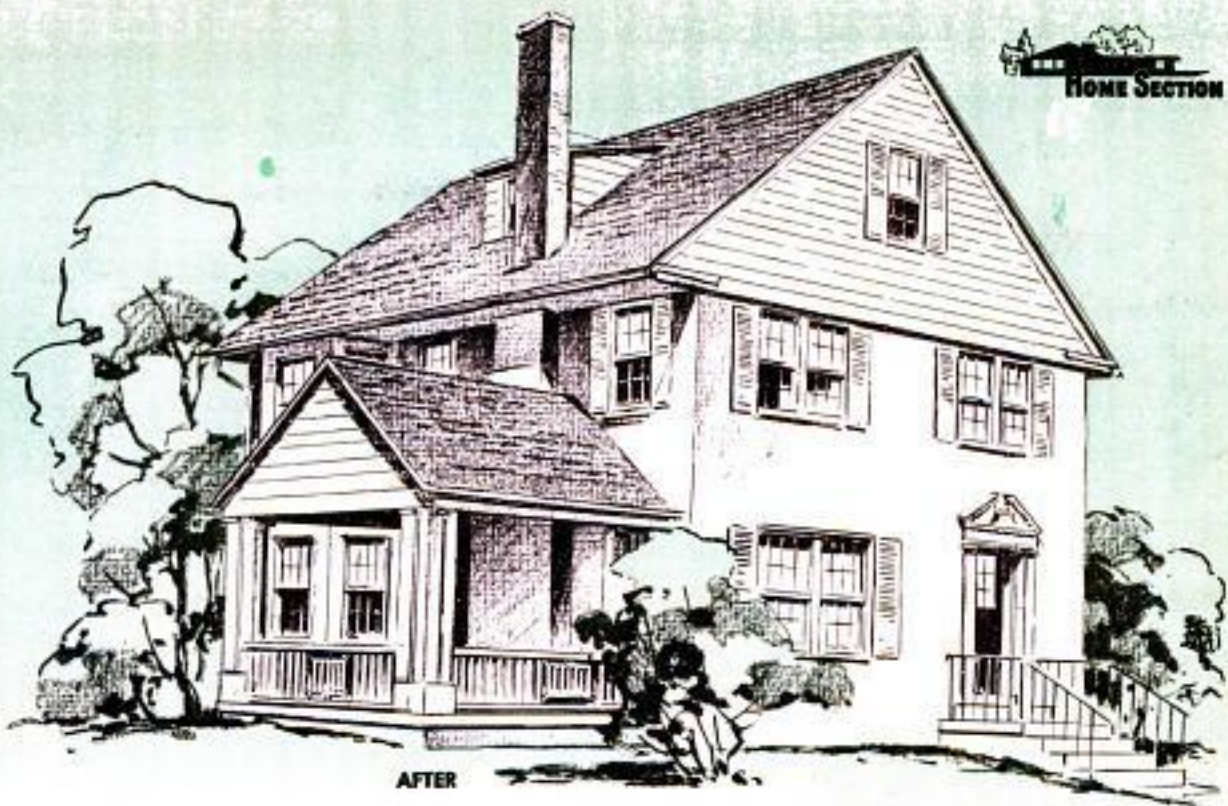
If you buy an old house with an eye to remodeling, the trick in getting your money's worth is to appraise correctly its possibilities beforehand. Take time to study the exterior from grade to ridge line, keeping in mind that on many old homes the removal of the wide cornice alone will materially change its appearance. Mentally take off the front porch or veranda, relocate the front door, remove a dormer or two, visualize a fresh coat of paint and already you have a new house in place of

the old. Now study the "befores" and "afters" below and on the three following pages to see what owners did to change the exteriors of several typical old homes. Note especially the changes made in the full two-story house pictured before and after in the center and upper views on the opposite page. Relocation of the dormer gave better utilization of the attic space and removal of the gable-end cornice overhangs and the installation of drop siding had the effect of widening the structure. Removal of the porch and relocation of the front door, which opens on a concrete stoop, provided for better distribution of living-room space, also served to maintain the balance of architectural details when shutters and side porch were added.

The house pictured in the before view at the lower right and below in the after view presents a somewhat different problem because of its rooms-in-line construction. Again the unattractive porch was removed and the gable extended to house the entryway. The louver fence, masonry planter and a new entryway and door alter the original so completely that it appears to be an entirely new structure.

The four views on pages 192 and 193 picture remodeling jobs carried out by the owners themselves. The two before views show what they started with and a careful study of the larger illustrations will show

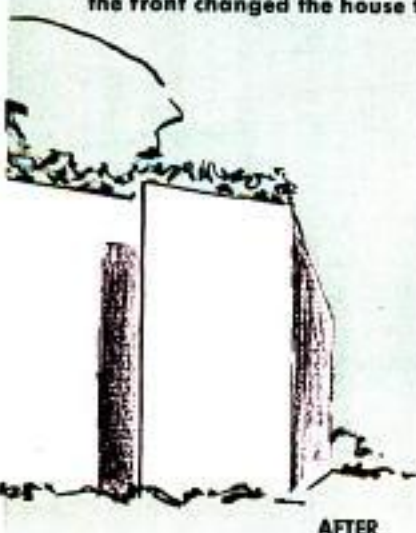


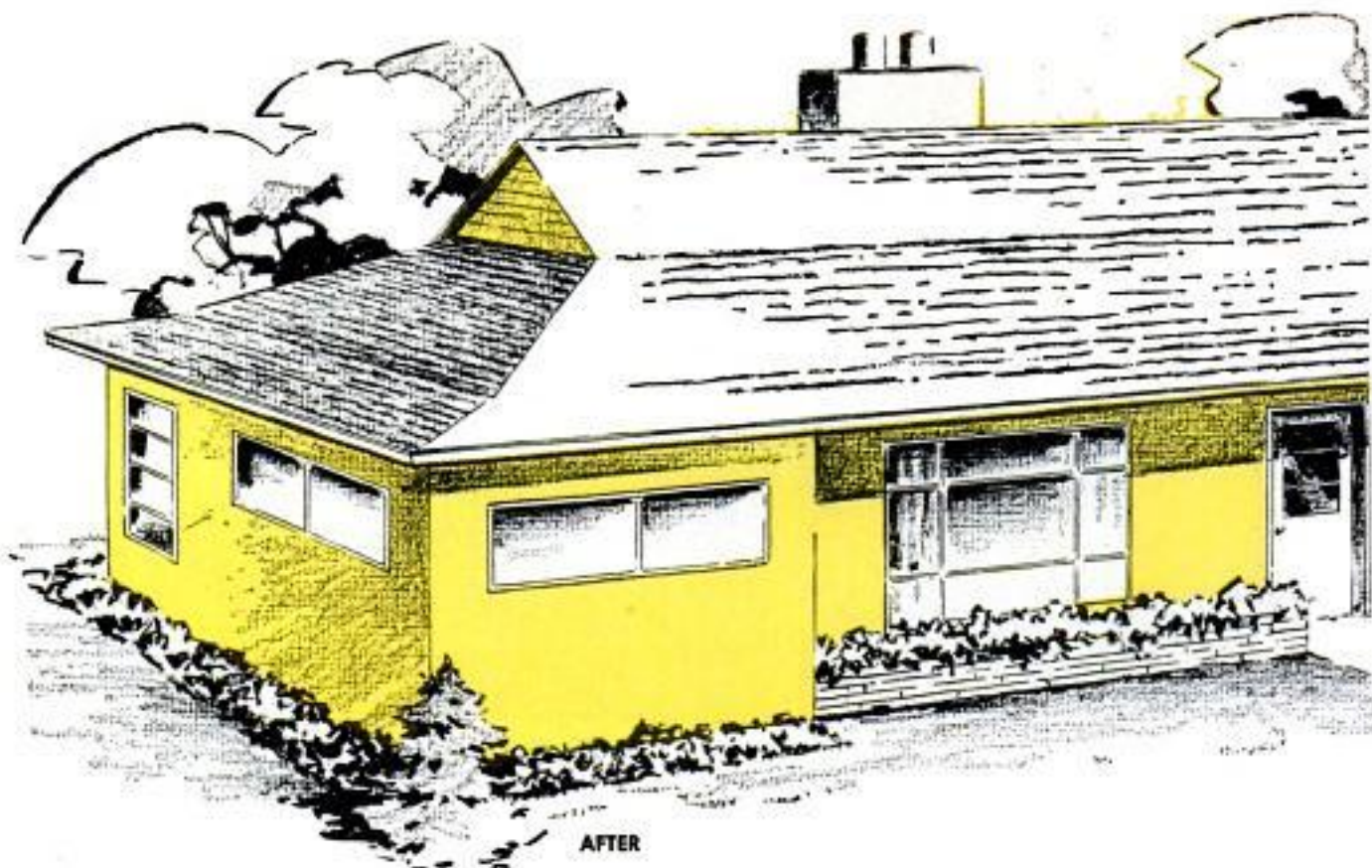


View at the right, center, is the "before" of the old home shown above after remodeling. Compare the two illustrations and note how few structural changes were necessary to modernize the exterior. Relocation of the porch and careful use of drop siding give the effect of lowering the height



Below, right and left, the home pictured in the before view is typical of many built from 40 to 60 years ago. Looks rather unpromising as it stands, but note what the owner did in view at left. Enclosing side yard with a louver fence and remodeling the front changed the house from old to new





Owners of these two homes, pictured in the before's below, did the work themselves. Owner of the smaller home needed more room and the additions planned and carried to completion are shown in the view above. Many homes of this type will permit similar alterations, creating greater livability and higher valuation



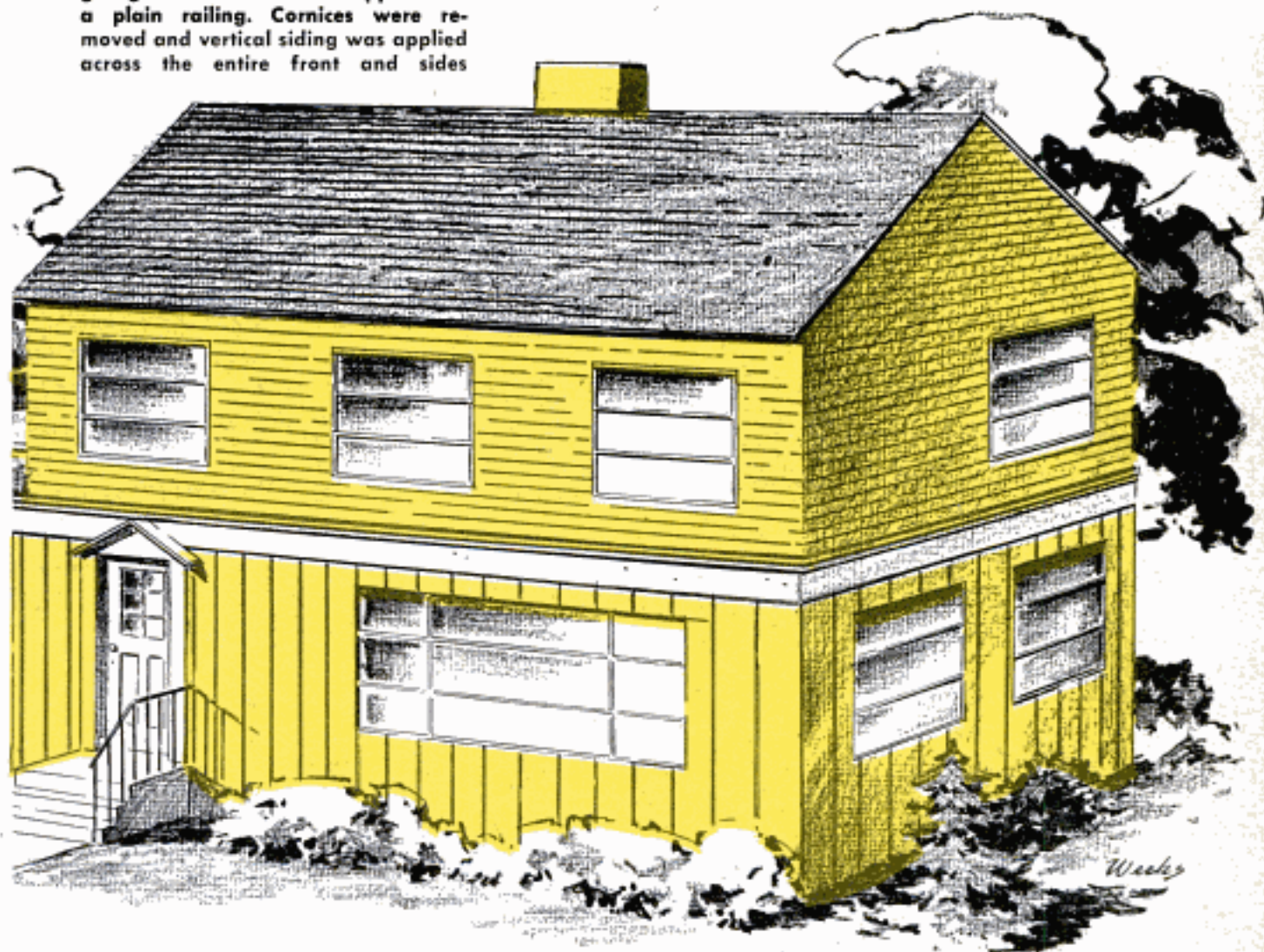
HOME SECTION

how well they succeeded. The owner of the small house needed more room and the upper view shows how he added to the existing structure. The width of the lot permitted expansion of the floor area in both directions but the height of the plate above grade required dual-pitch roof extensions to give the proper ceiling height in the additions. In this job the chimney was rebuilt to provide a second flue for a fireplace in the living room. The house in the lower before view was a very old one, but was found to be sound structurally. Remodeling required very little change in the interior. Because of this the owner concentrated all effort on modernizing the dated exterior. What he did is clearly shown in the larger view below. First, the porch was removed and the garage attached, the flat roof deck over the garage being finished with a plain railing. Then vertical siding was carried across the entire width at the height indicated. The original window openings were enlarged and new sash of modern design installed, including a large panel window in the living room. Then the single dormer and cornices were removed, the latter cut back flush with the walls and finished with fascia boards. An iron-railed concrete stoop and two coats of paint rounded out the job.

All the homes pictured were structurally sound to begin with and did not require any major alteration of the original framing in order to achieve the desired



Lower view, opposite page, is the before of the remodeled home pictured below. No major structural changes were necessary. So the flat-roofed garage was built on and topped with a plain railing. Cornices were removed and vertical siding was applied across the entire front and sides

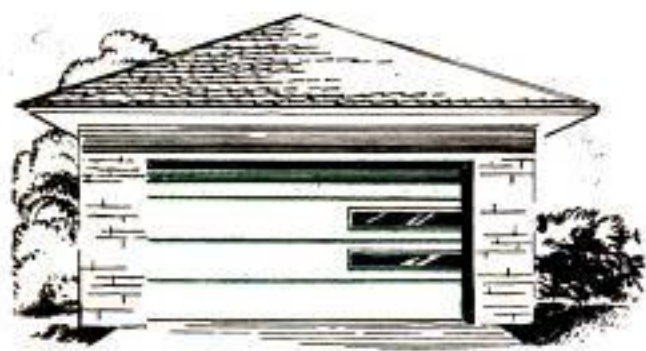




A new front entryway usually is a part of every remodeling job and manufactured units offer a wide choice of design. Shutters add pleasing detail



A recessed doorway has several advantages. Door itself is protected from weathering, it is less likely to leak and there are added decorative possibilities



A modern door makes an old garage look new. These units are available ready-made in several styles which can be adapted to almost any building type



Due to variations in architectural lines a garage with a gable roof usually appears its best when fitted with a multiple-panel door of the type pictured



Above, a woven closure for "weather" end of carport added a pleasing appearance detail to this small home. Below, utilization of carport as a living area

result. These are points to consider in any remodeling job.

The suggestions on this page are unit improvements that can be added to old or new homes. Garage and entry doors are manufactured units and come to you ready to install. The sketch at the left shows how one owner closed the "weather" side of the carport with closures woven from hardboard strips. The two sketches below show the addition of carports to existing small homes. ★ ★ ★

When lot size permits, a carport is a practical addition to the small home. Has a definite appearance value. Note below how carport lengthens roof line



the

POPULAR
MECHANICS

CRAFTSMAN



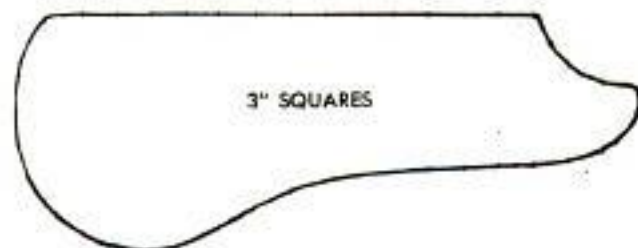
FREE-FORM TABLE OF CORK

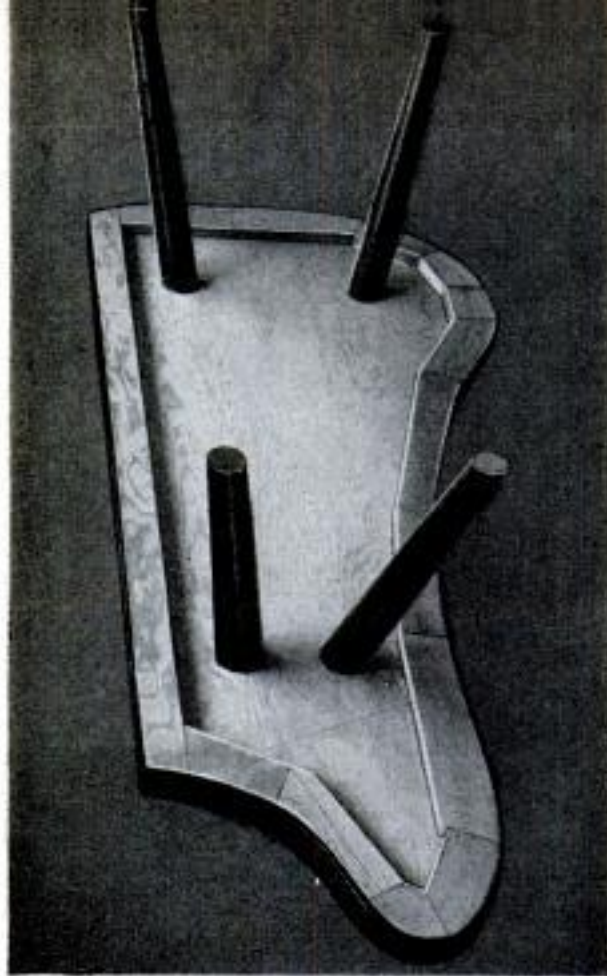
By Tom Riley

YOU CAN give your home a touch as modern as tomorrow and as individual as yourself by designing your own free-form tables. Whether you plan an occasional table to fit some corner, an end table or a coffee table, you'll find the construction easy and the results attractive.

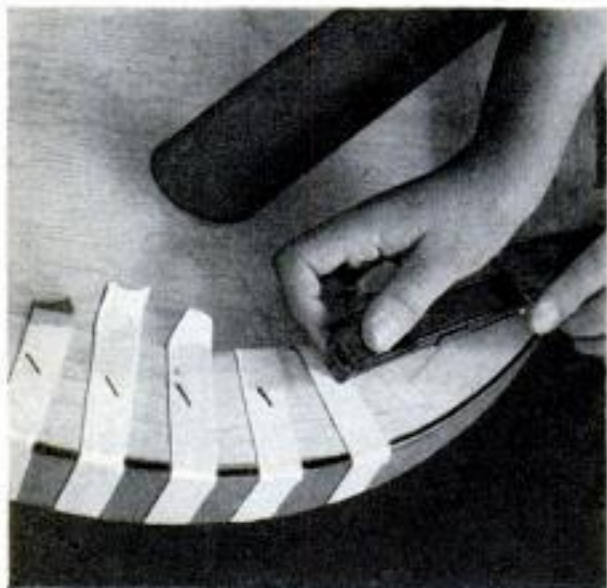
As shown in the example, the table can have free-form curves of any radius down to 2½ in. without complications. Standard cork floor tile is used to cover the top and edges, giving a rich appearance and producing a surface that is immune to scratching and to rings from moist glasses. The cork requires only a coat of wax as a finish. It is available at floor-covering stores in several tile sizes and in shades from dark to very light brown.

First experiment with various shapes on a small piece of squared paper, until you





Above, underside view of table, showing how edges are built up from scraps. Below, after cork is applied to edges, it is held in place with masking tape



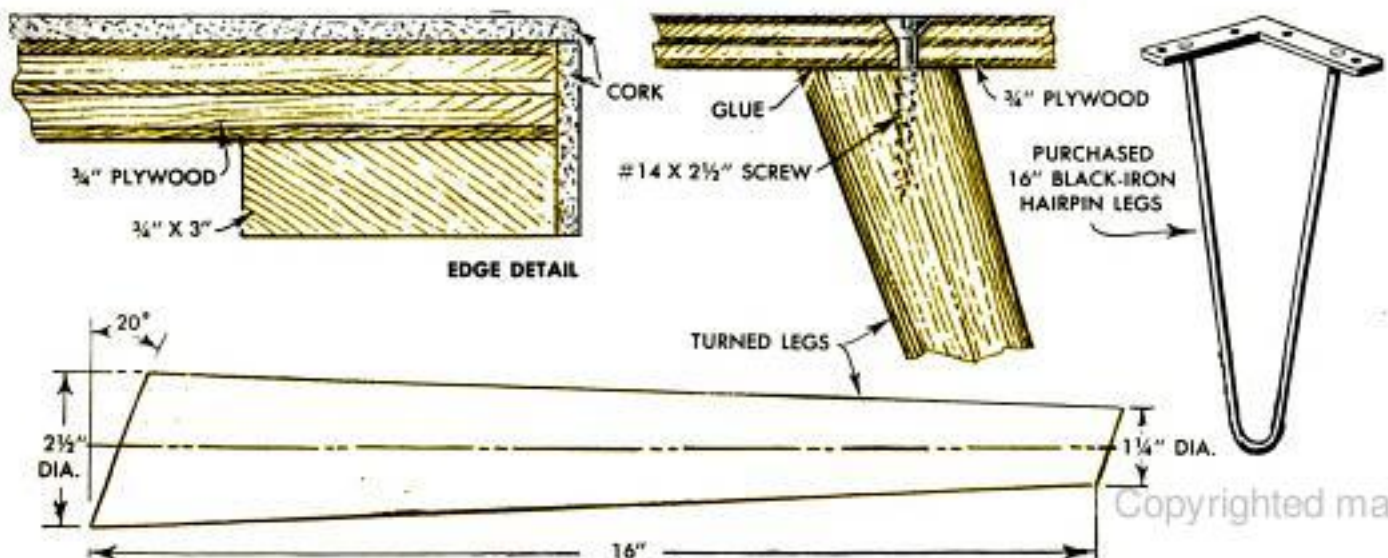
are satisfied with the shape. Then transfer the final design to a squared-off sheet of heavy paper, bringing it up to full size as you do so. Using this pattern, cut the top from $\frac{3}{4}$ -in. plywood. To build up the thickness of the edge, scraps of plywood or $\frac{3}{4}$ x 3-in. pine are glued and nailed along the underside of the edge, and then the double thickness is sanded smooth.

The legs can be of dark walnut, light birch or of wrought iron. The wooden legs are turned on a lathe to a pleasing taper and then secured to the top with glue and large screws. Drill the screw holes straight down, as shown, so that the legs can be pivoted for alignment with each other. The legs can be varnished before assembly or rub-finished on the lathe with linseed oil.

Tile $\frac{3}{16}$ in. thick should be used for bending sharp curves; otherwise, $\frac{1}{4}$ -in. tile is best. To bend around a sharp curve without breaking, heat the underside of the tile with an electric pressing iron until it is hot to the touch. Select flush, square-edged tile, not beveled, and use a straightedge and a sharp knife for cutting. Place the cork around the edges first, cutting strips $\frac{1}{4}$ in. wider than needed. Coat each strip with glue and then secure it in place with masking tape. It is best to anchor the masking tape with a tack or staple at each end.

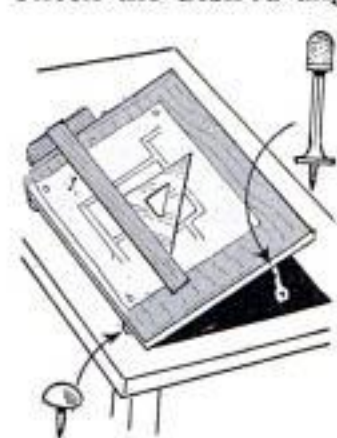
The cement used to apply cork tile to walls is suitable, as is any good furniture glue. Linoleum cement should not be used, because it takes several days to dry, and is hard to work with.

Allow a day for the edges to dry, then trim them top and bottom with a sharp knife. Then sand smooth with coarse and fine sandpaper. Next apply glue liberally over the table top and lay the tiles in place. They should extend over the edge all around. Weight them down with sand bags or books until dry, then trim carefully and sand smooth. Finish the top with a coat of paste floor wax. If the top should be nicked at any time, the hole can be filled with a mixture of paste wax and dust obtained from sanding a scrap of cork. ★ ★ ★



Doorstops Hold Drawing Board In Tilted Position

Screwed into the underside of a drawing board, two rubber-tipped doorstops support it in a tilted position on a table or desk. Check the desired angle of the board before attaching the stops.



If desired, drive a couple of rubber-headed tacks into the lower edge of the board. In this way, the board will be supported entirely on rubber to avoid marring highly finished surfaces. — Norm Jacky, Fond du Lac, Wis.

Wash Surface With Turpentine After Using Paint Remover

After paint has been cleaned from a surface with paint-remover solution, the surface should be thoroughly washed with turpentine and then wiped dry with clean cloths. This is done because most paint and varnish removers contain wax, some of which is deposited on the cleaned surface, and paint will not dry properly on waxed surface.

Multipurpose Tool for Darkroom Provided by Wiper Blade



A soft windshield-wiper blade provides an excellent tool of many uses for the darkroom. It can be used as a squeegee for wiping roll film hung on clips, as shown in the illustration, and for wiping cut film placed on a sheet of clean glass. The wiper blade also can be used to clean the glass on the contact printer and to remove the

excess water from ferrotype plates. Because of its softness, the blade does a better job than a roller, to squeegee prints onto a ferrotype plate. Also, since the blade can be purchased in a length that will cover the entire print in one stroke, better contact with the tin is assured.

Robert C. Florian, Chicago.



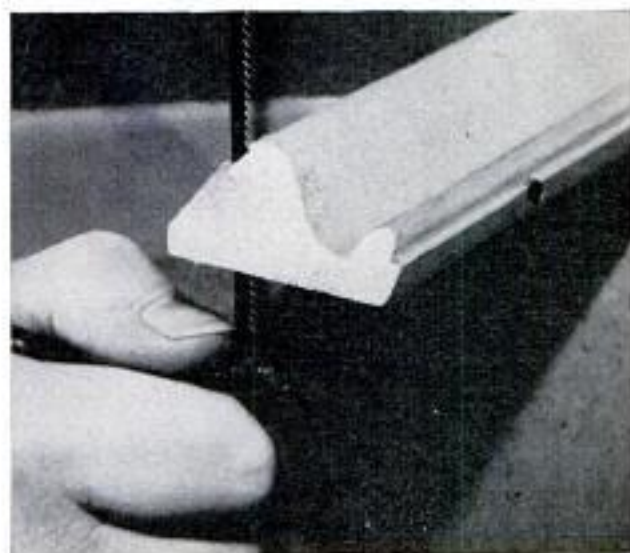
Leather Sheath Covers Exposed Blade of Ax

To eliminate the chance of accidentally being injured by the naked cutting edge of your ax when carrying it in your pack, boat or car, make a sheath for the blade as shown. Using heavy leather, lay out the two sides to fit the size and shape of the ax head. Then join the pieces with copper rivets of the type used in leatherwork. The strap and buckle, which can be obtained from an old piece of luggage or briefcase, are riveted in the same manner.

Russ Jenkins, Chicago.

Angle Cut on Ornamental Molding Provides Guide Line for Coping

When fitting an ornamental molding or coping into a corner, it usually is difficult to make the irregularly curved surfaces meet exactly to form a neat corner. One easy way of doing it is to make a 45-deg. cut across the end of the molding, as shown, and then use the resulting profile as a guide line along which to cut with a coping saw. The coped piece will then butt perfectly at right angles to another section of the molding.—R. F. Donovan, Guttenberg, N. J.



Bookshelf Modified for Magazines Neatly Stores Back Copies



Modifying a bookshelf to fit the size of a favorite magazine will enable you to store periodicals in such a way that any back copy can be picked out. The shelves should be fitted with vertical partitions so that only a limited number of magazines are in each section. Thus, the removal of one magazine will not cause the others on the shelf to topple over.

Richard Lepley, Norwood, Ohio.

Washer Held in Hose Connection By Long Straight Pin



A long straight pin or a length of fine wire can be used to overcome the difficulty of keeping washers in hose connections that are disconnected. The pin from which the head is removed,

or the fine wire, is forced through the edge of the washer and allowed to project on both sides. The projections permit the washer to be "threaded" into the hose connection, thus locking it in place.

William B. Eagan, Louisville, Ky.

Fish "Weighed" With Tape Measure

Fishermen can get an accurate approximation of the weight of their catch with a tape measure. First, measure the circum-

ference of the fish, in inches, at its largest girth. Square this number and multiply by the length in inches. The latter measurement is taken from the fork of the tail to the end of the head. Divide the result by 800 to get a good estimate of the fish's weight.

Electrical-Appliance Cord Coiled To Keep It Off Floor

Instead of letting the long electric cord of a lamp, radio or other appliance lie on the floor where it is unsightly and may cause someone to trip, twist part of it to form a coil. This will shorten the cord and lift it from the floor, yet permit using the



full length whenever necessary. To form the coil, wrap the cord around a pencil or small dowel until the cord is the correct length.

Rubber Cemented to Chinaware Protects Furniture Finish

Rubber rings used to seal fruit jars are ideal for the bottoms of ash trays, vases, figurines and other chinaware and pottery objects that might damage the finish of furniture. Rubber has the advantage over felt, ordinarily used, in that it does not absorb water when the object to which it is attached is washed. Also, the rubber cement used to attach the rubber to the object does not dissolve in water, as do some adhesives used to attach felt.

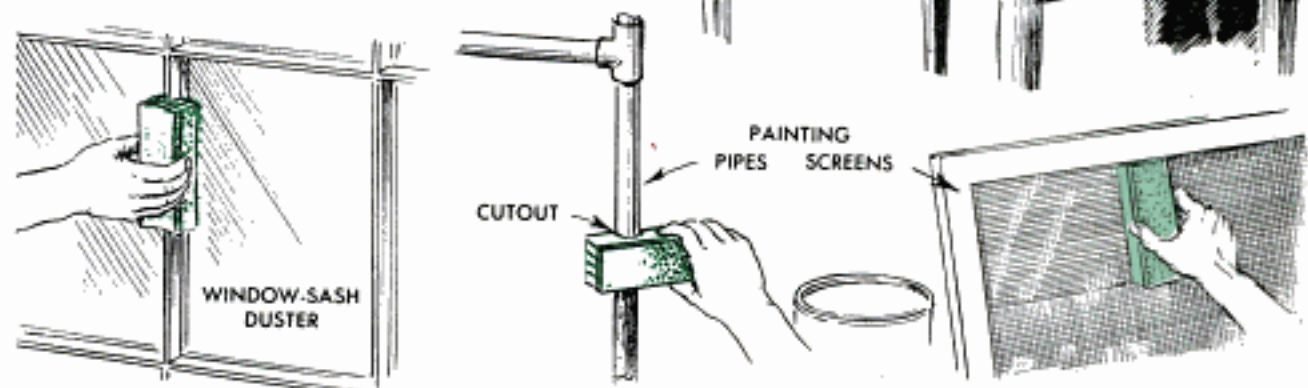
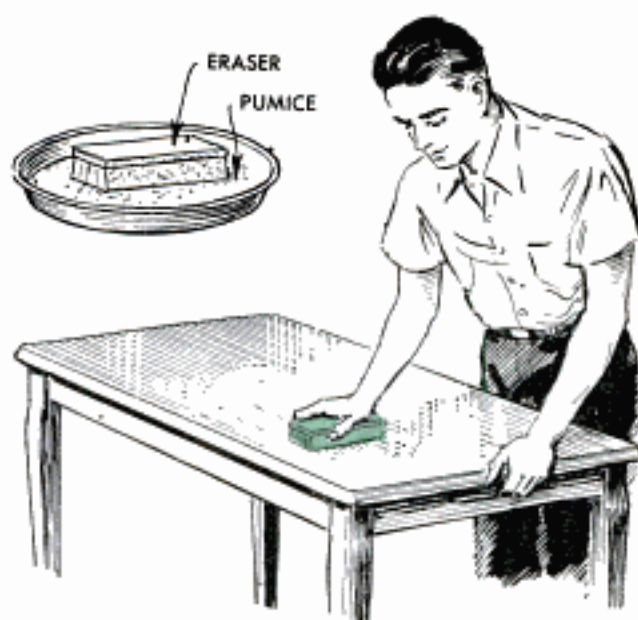


☐ To stop ants from entering your home, place cucumber peelings around the door, along the molding or at any other point where they might enter.

Valuable Uses For Blackboard Erasers

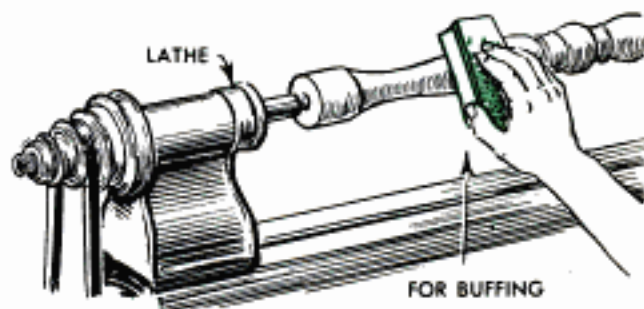
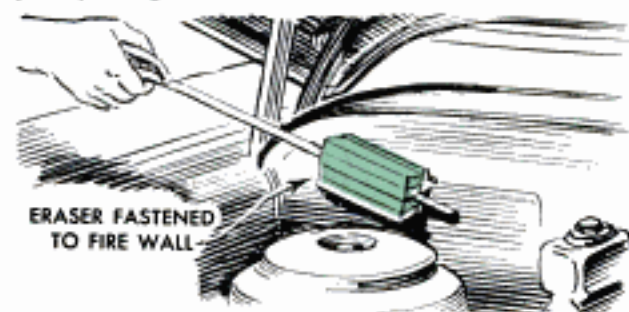
By James Ship

The common blackboard eraser has many extra uses, such as the one at the right, where it is being used to apply pumice during furniture refinishing. This makes it easy to get a professional hand-rubbed look



A housewife can save time and do a better dusting job by using an eraser to dust window-sash dividers

At those times when a paintbrush won't do the job, as when painting screens or pipe, use an eraser

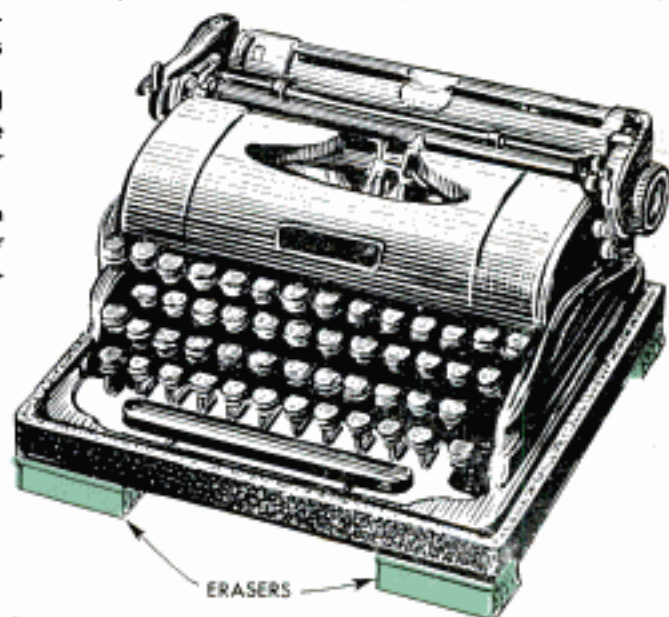
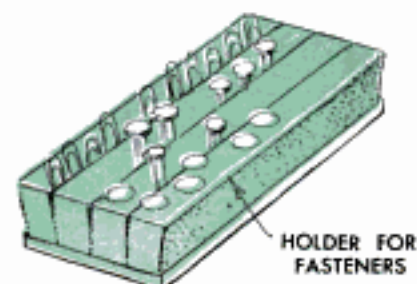


Mounted on the fire wall of an automobile by means of two screws, the eraser becomes a permanent oil-stick wiper. Simply draw the stick through the folds

After making a turning on a lathe, you will find the eraser an excellent tool for buffing and polishing to a professional finish. Keep several in the shop

Portable typewriters usually are fastened to the lid of the case and used right in it. To silence noise from the machine, install an eraser under each corner

Screwed to the bottom of a kitchen or workbench drawer, an eraser will provide ideal storage for odds and ends such as thumbtacks, paper clips, etc.

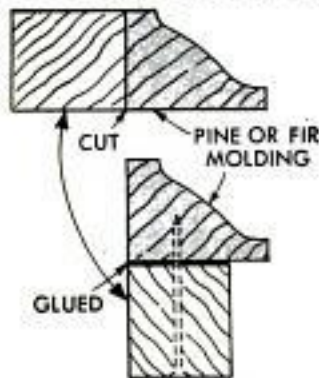




Risers on Basement Stairs Help Keep Floor Clean

Troubled with dirt dropping below the basement stairs when they were swept, one homeowner nailed on pieces of hardboard as risers. The risers are fastened at the top of each step to lengths of quarter-round molding nailed to the underside of the treads. As the treads overlap a distance sufficient for "kick space," no trouble was experienced from the risers loosening.

Inexpensive Lumberyard Molding Used for Picture Framing



Attractive picture-frame stock can be made by ripping inexpensive fir or pine window-stop molding along the milled edge. As shown in the detail, the milled edge is cut away from the plain portion of the stock

which is then nailed and glued to the back to form a rabbet for the glass and picture.

Edward E. Thorp, Montclair, N. J.

Preheated Ferrotypes Plates Reduce Print-Drying Time

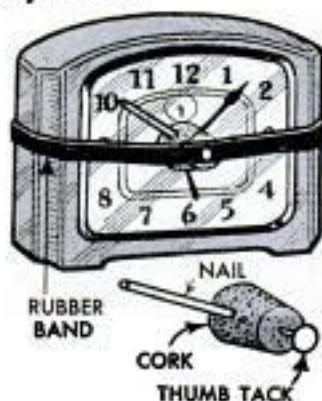
Faster print drying with an electric drier — single or double — can be accomplished by preheating the ferrotypes plates. An extra plate or plates are used, and while one set of prints is in the drier, the extra tin is placed beneath the drier where it absorbs the waste heat. When the set of prints in the drier is finished, the preheated tins

are used for the next set. Because they require less heat, they will, of course, require less time in the drier.

Hugh Lineback, Stillwater, Okla.

Nail and Cork Over Clock Face Provide Emergency Timer

An emergency timer, for photo or other work which requires less than an hour's time, can be made by forcing a nail through a cork and holding this assembly over the center of the face of an alarm clock with a rubber band and thumbtack. In use,



the pointer of the "timer" is set at a predetermined time and when the minute hand of the clock coincides with the pointer, the proper time has elapsed.

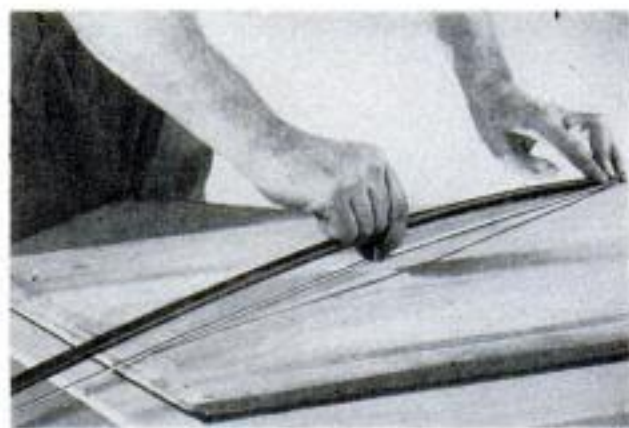
Cut Waste by Puncturing Lemon

To prevent waste when only a few drops of lemon juice are required by a recipe, puncture the end of the lemon with a fork and squeeze out the required amount. Thus treated, the lemon may be kept in the refrigerator without spoiling or drying out, and can be used later.

D. Fenn, Chicago.

Chalk Line Stretched With Bow Permits Accurate Marking

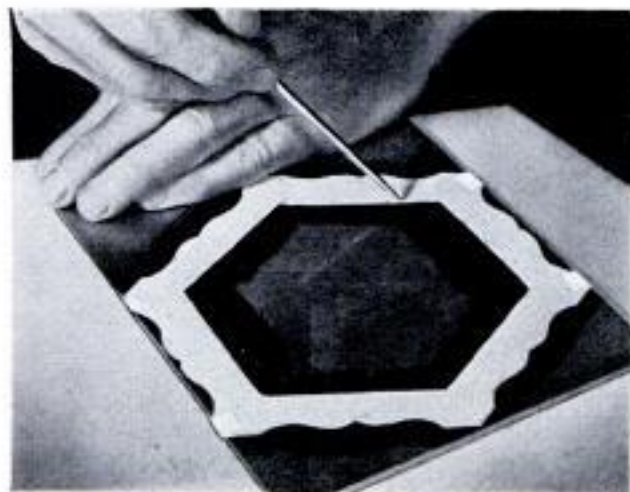
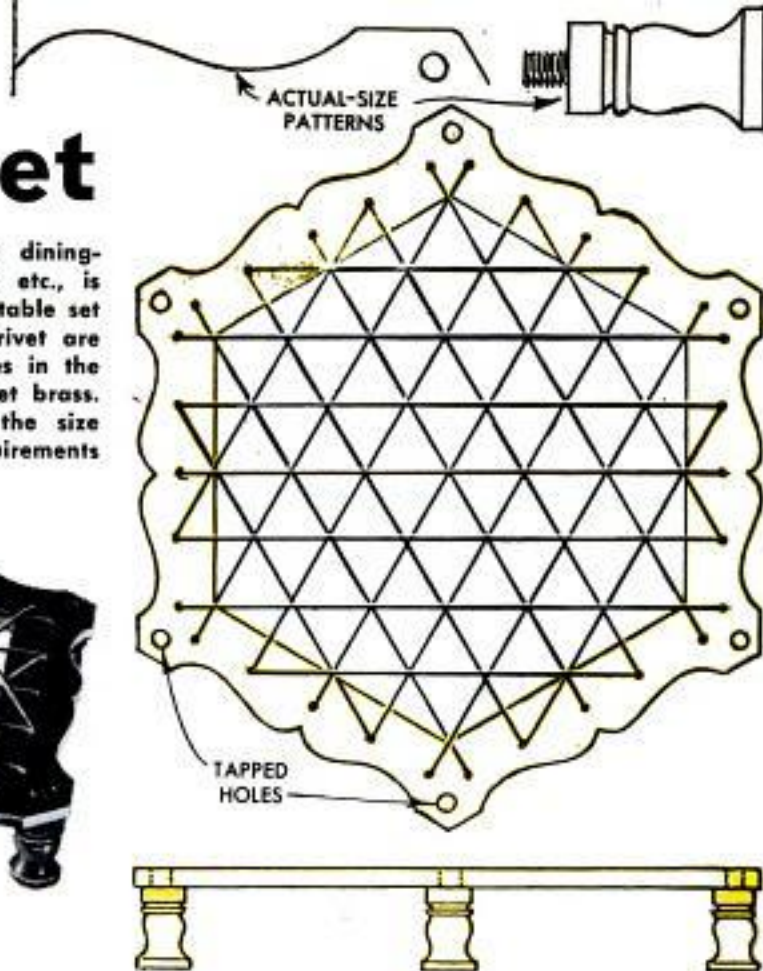
A chalk line strung on a bow will permit quick and accurate marking of flat stock for rough cuts. The ends of the bow are pointed to be in alignment with the cord; thus making it possible to accurately locate the cord on measurement marks. The cord is not subject to warping, as is a wooden straightedge and so can be stored in any convenient location.



WTM 56

Brass Trivet

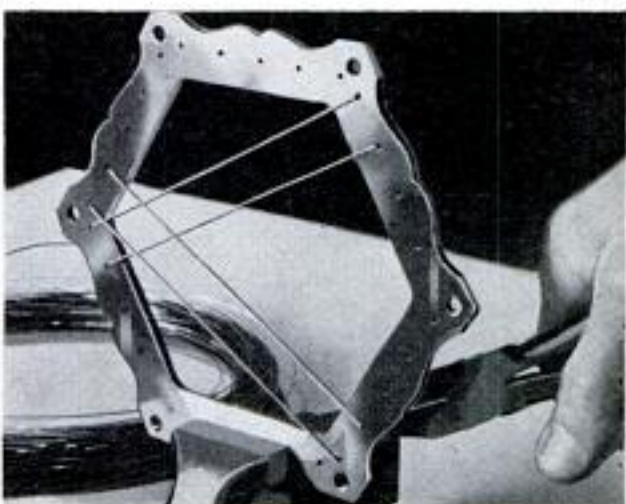
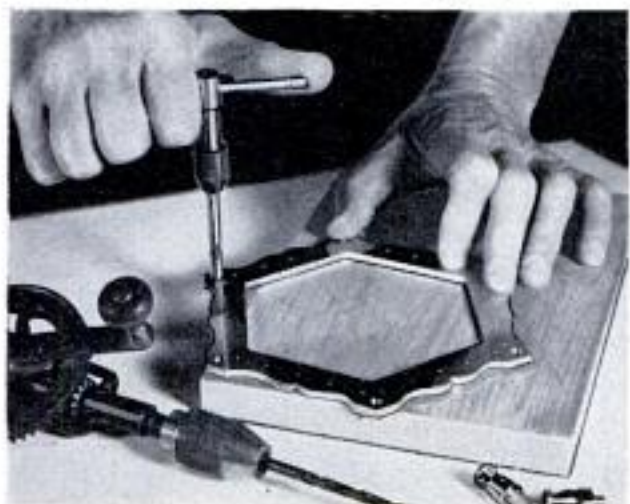
An attractive trivet that will protect the dining-room table from hot dishes, the teapot, etc., is easy to make and adds a fine touch to a table set for a dinner party. The six feet of the trivet are brass lamp finials turned into tapped holes in the frame, the latter being cut from 1/8-in. sheet brass. The trivet pictured is 7 in. across, but the size can be varied to suit your particular requirements



Above, brass is painted with India ink and the outline of the trivet frame is scribed on the brass, using a cardboard template. Holes for the finials are center-punched, drilled and then tapped, as below



The frame is cut out on a jigsaw, above, using a fine-toothed blade. Below, the frame is set in a vise and strung with wire. To finish the assembled trivet, polish with fine steel wool and coat with lacquer



Solving

HOME PROBLEMS . . .



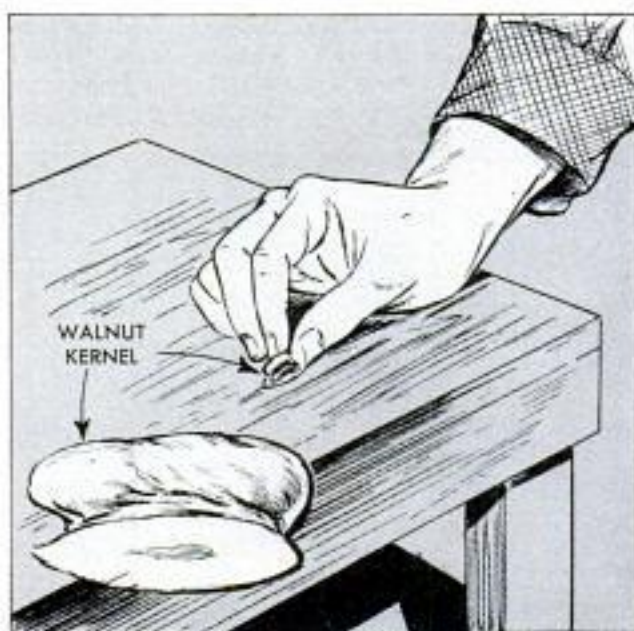
HOUSE PLANTS WILL NOT BE DAMAGED from too much water if pots are placed in coffee cans packed with sphagnum moss. Moss absorbs excess water, keeps pots cool

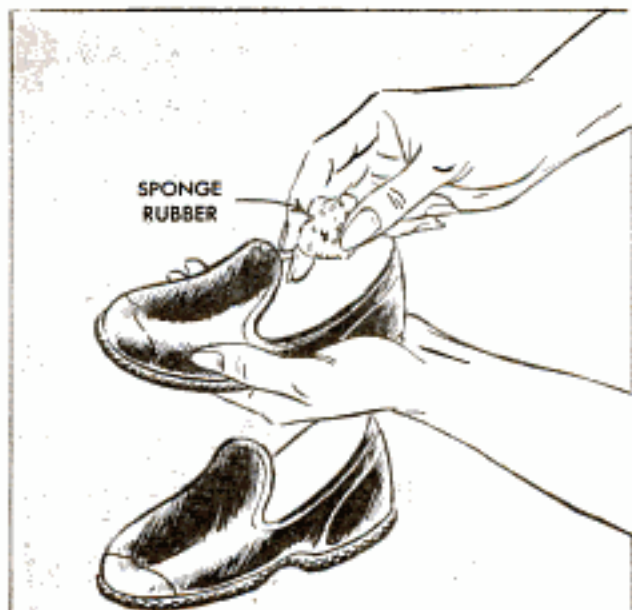


A SAMPLE OF YARN to be matched can be carried in a handbag, unsoiled and not easily mislaid, by fastening it inside cover of a matchbook with cellulose tape

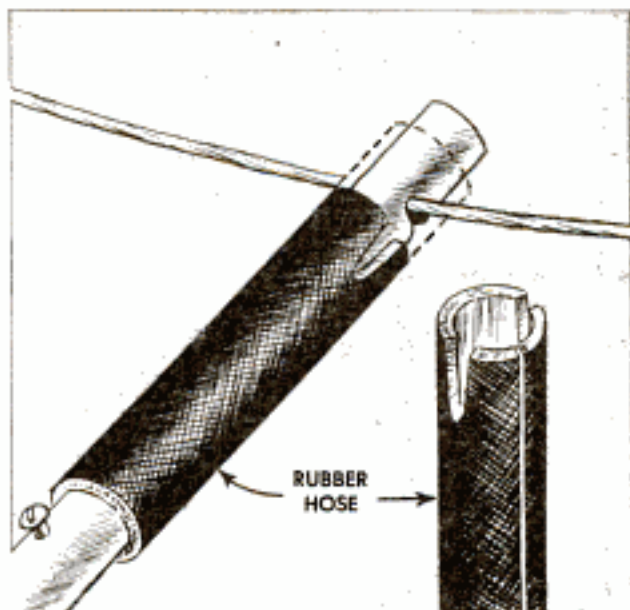


SCRATCHES IN FINISH of walnut furniture are made invisible by rubbing them vigorously with the cut surface of a freshly sliced walnut or Brazil nut

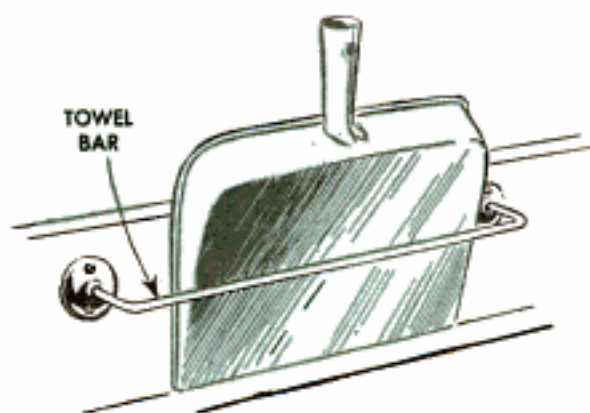




A CHILD'S OVERSIZE RUBBER can be fitted snugly by inserting sponge rubber in the toe. The sponge rubber will not pack into uncomfortable wad as will paper

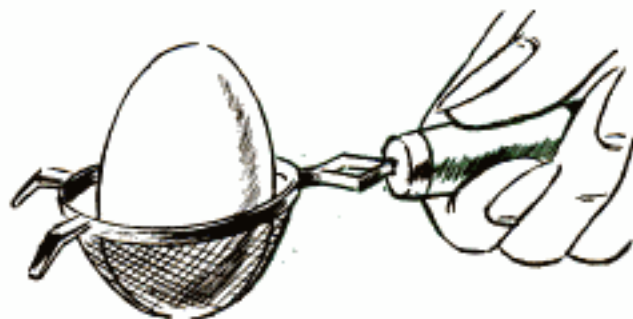
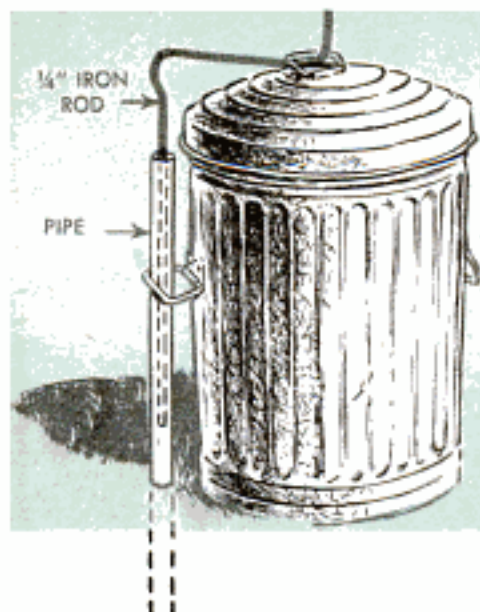


CLOTHES POLES WILL NOT SLIP on line if fitted with sections of hose notched as in detail. The line fits in groove cut in side of pole and is held by hose



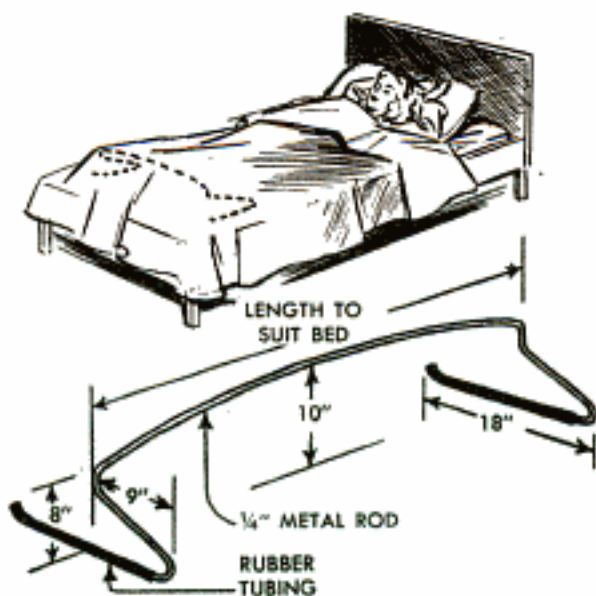
SCREWED TO THE BASEBOARD at a convenient spot in the kitchen or broom closet, an ordinary towel bar can be used to provide a handy rack for storing a dustpan

GARBAGE CAN IS ANCHORED by driving pipe into ground so it passes through handle. A $\frac{1}{4}$ -in. steel rod, bent as shown and slipped into pipe, will hold lid

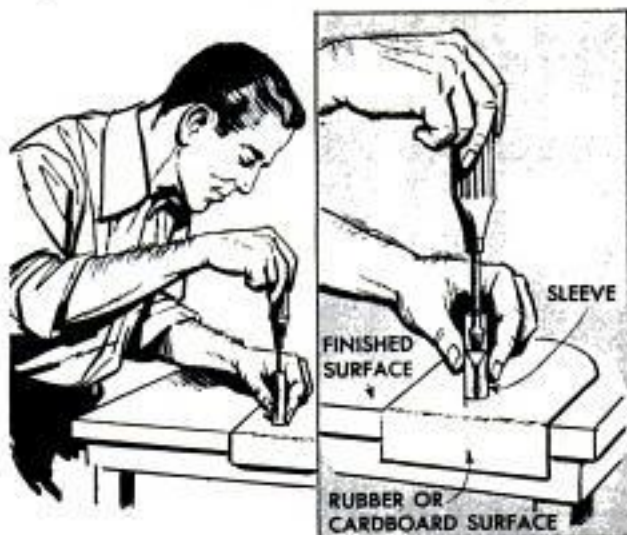


IF NO HOT-FOOD TONGS ARE AVAILABLE, hard or soft-boiled eggs can be removed from pan of hot water in which they are cooked by using a tea strainer. The strainer permits eggs to drain dry quickly and will not crush the shells as will some tongs

FATIGUE AND DISCOMFORT caused by weight of blankets on the feet of person in bed can be relieved by using frame of $\frac{1}{4}$ -in. rod. Bend as shown in detail



Guards Protect Wood Surface Against Screwdriver Damage



Two simple guards will prevent the damage to a finished wood surface caused by a screwdriver slipping off a screwhead. First, use a sleeve, such as a length of pipe or tubing, in which both screw and driver will fit without binding. Next, place a shield made of rubber or heavy cardboard over the wood surface. Cut a hole in the shield, slightly larger than the screwhead, but smaller than the sleeve. A combination-type drill should be used, or a pilot and shank hole drilled, to receive the screw.

Powder Puff Chucked in Drill Utilized as Buffing Wheel



The next time you need a small buffing wheel for cleaning jewelry, silverware or other articles with a figure or pattern that requires a high polish, use an ordinary powder puff chucked in a $\frac{1}{4}$ -in. portable drill. Punch a hole in the center of the puff and slip it on an "arbor" made

from two washers and a nut fitted on a machine screw, as shown in the detail.

John W. Sherman, Mountain View, Calif.

Extra Blades for Carving Tools From Injector-Razor Blades

Modelmakers will find that discarded injector-razor blades can easily be made into replacement blades for carving tools. After grinding a blade to the shape desired, hone

the cutting edge on a fine oilstone. Care must be taken, however, not to overheat the blade, since this will draw the temper.

John A. Comstock, Wellsboro, Pa.

Rubber Boots Dried Quickly With Aid of Hardware Cloth

Drying wet rubber boots can be hastened by holding the tops of the boots open with a piece of hardware cloth. The cloth is formed into cylinders and one is placed in the top of each boot, thus permitting circulation of air.—Howard E. Moody, Upper Jay, N. Y.



Heat Restores Ball-Point Pen

After remaining unused for some time, ball-point pens may become inoperative. When this happens, the pen usually can be restored to usefulness by heating the point slightly with a match, or by immersing it in hot water. Bring the water to a boil, remove it from the stove and then submerge the point for about ten minutes.

Spencer A. Pease, Wauwatosa, Wis.

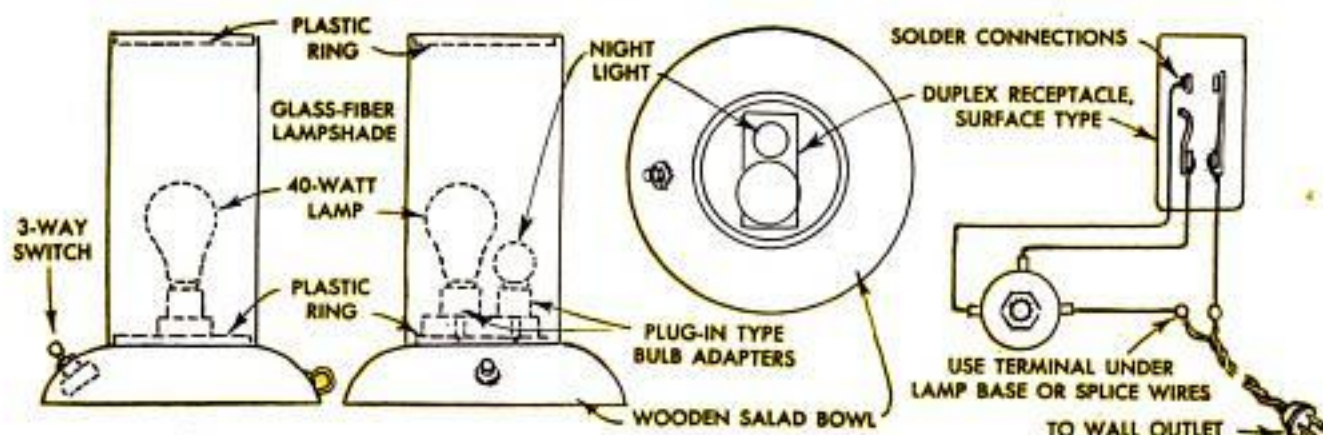
Round Typewriter Eraser Provides Abrasive Disk

A rubber abrasive wheel for cleaning and polishing small items can be made quickly by mounting a round typewriter eraser on an arbor for use in a small high-speed hand grinder. Place a small lock washer on the arbor shaft to prevent the wheel from working loose while in use.—Pvt. Philip E. McCafferty, Fort Bliss, Tex.



Lamp for Vanity Table Also Serves as Night Light

Here is a chimney lamp with a dual purpose, since it serves as an attractive vanity lamp and also provides a soft night light. The base is a wooden bowl 9 in. in dia., from which the wax coating is removed with sandpaper. Holes are drilled for the wiring and switch and a plastic ring to support the shade is screwed in place. As shown, a double receptacle is modified to permit use of 40 and 7½-watt lamps. The shade is made of a 10½ x 15½-in. piece of Fiberglass lampshade material. This is formed into a cylinder, with the overlapping edges glued. A plastic ring cemented into the top of the shade maintains the shape. If two of the lamps are used together, only one is wired for the night light.—R. L. Oldenburg, Levittown, N. Y.



Doghouse Built Under Workbench Heated by Light Bulb

By enclosing the lower part of your workbench it will provide an excellent house for your dog. Sufficient heat to keep the dampness at a minimum and allow the dog to be

comfortable is provided by an electric-light bulb on the underside of the bench top. The bulb is fitted with a reflector as shown in the detail. The window which encloses the bench shown was used because it happened to be available, but the sides of the house could be made of any material at hand. The door opening can be hung with burlap. Bruce C. Vaughan, Jr., Springdale, Ark.



Salt and Pepper Shakers for Picnics

Individual salt and pepper shakers, handy for traveling and for picnics, can be made from dental-floss containers. Turn back the metal hook on the top of the container and punch five to seven additional holes in it. After the containers are filled, place a paper or cork disk under the cap to prevent spilling while in transit. Remove this disk and the little shaker is ready for use.—Helen Lemberger, Chicago.

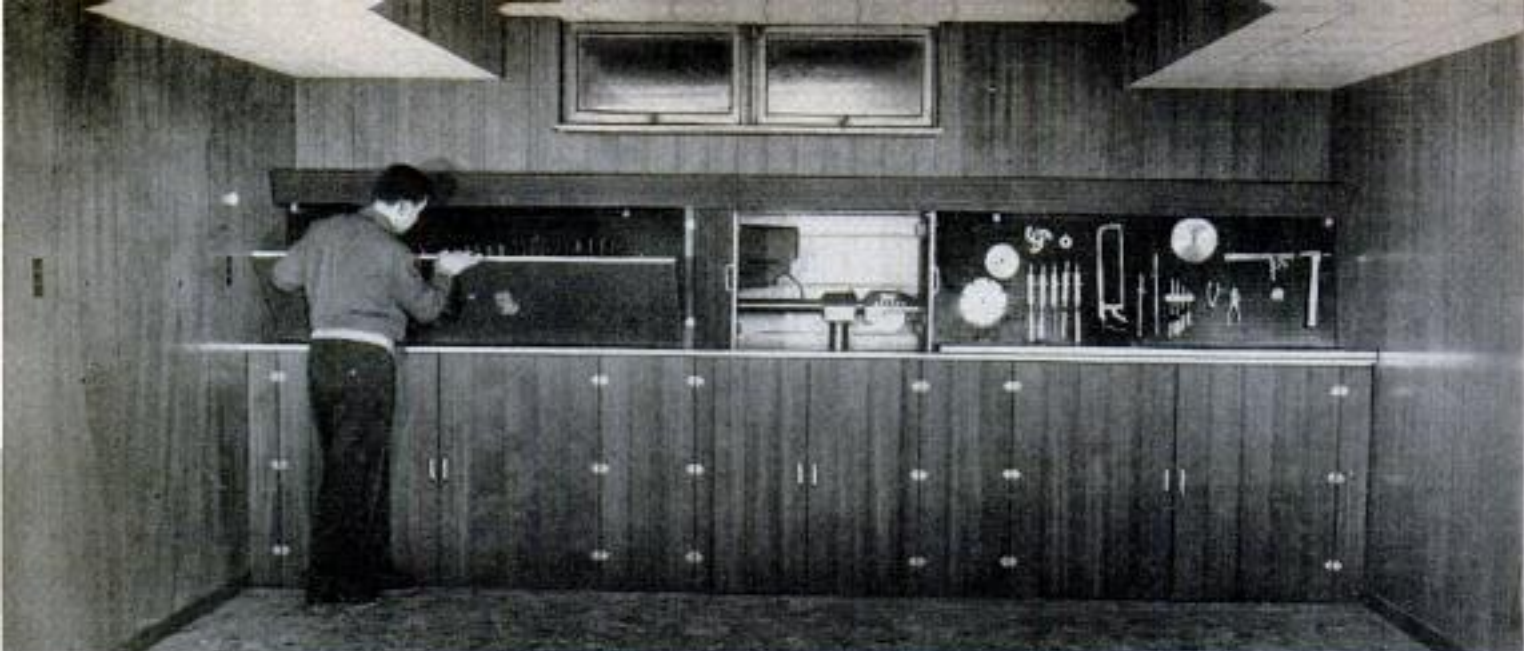


Photo above shows one of the tool-panel doors being closed while the other one rests on full-length counter



Folding HOME WORKSHOP

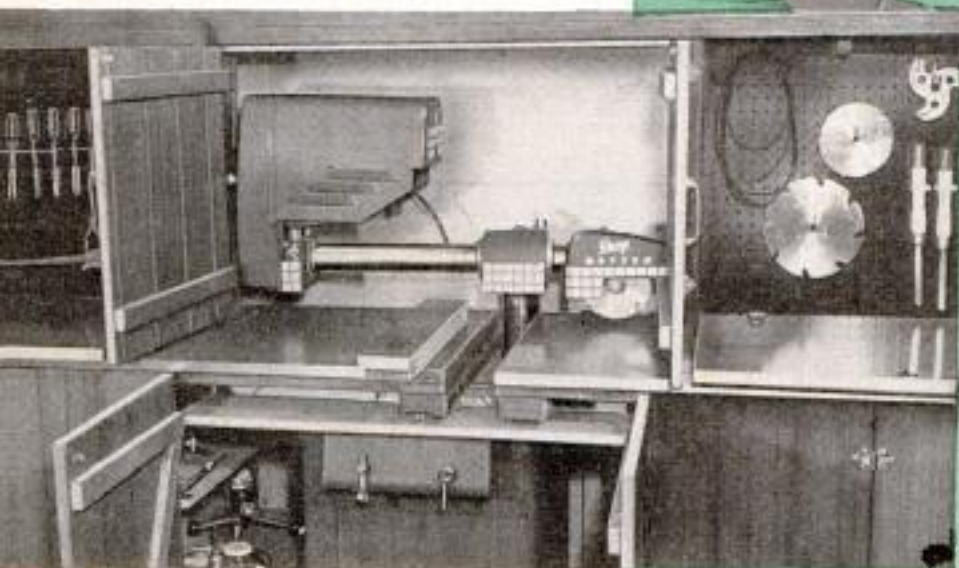
There is no conflict between workshop and recreation room in the home of Dorr Beale of Shopmaster, Inc. He designed and built this recreation-room power shop that folds completely out of sight in a few minutes

With workshop folded away, the full-sized recreation room, including shuffleboard, is used to full advantage



W7M 56

LACK OF SPACE need not deprive you of a home workshop and a playroom. Combine them in one room which is convertible from one to the other in a few minutes. The shop is designed around the increasingly popular combination power tool, which slides into a counter and cabinets built along one wall. Horizontally hinged doors, which conceal hand-tool panels, fold down to form a bench top over the counter. When the doors are closed, counter can be used for games or for serving refreshments. Photos on following page show construction. ★ ★ ★



Combination power tool is stored neatly in custom-built center cabinet. Section of counter top is removed to permit entrance of the vertical column of the power tool

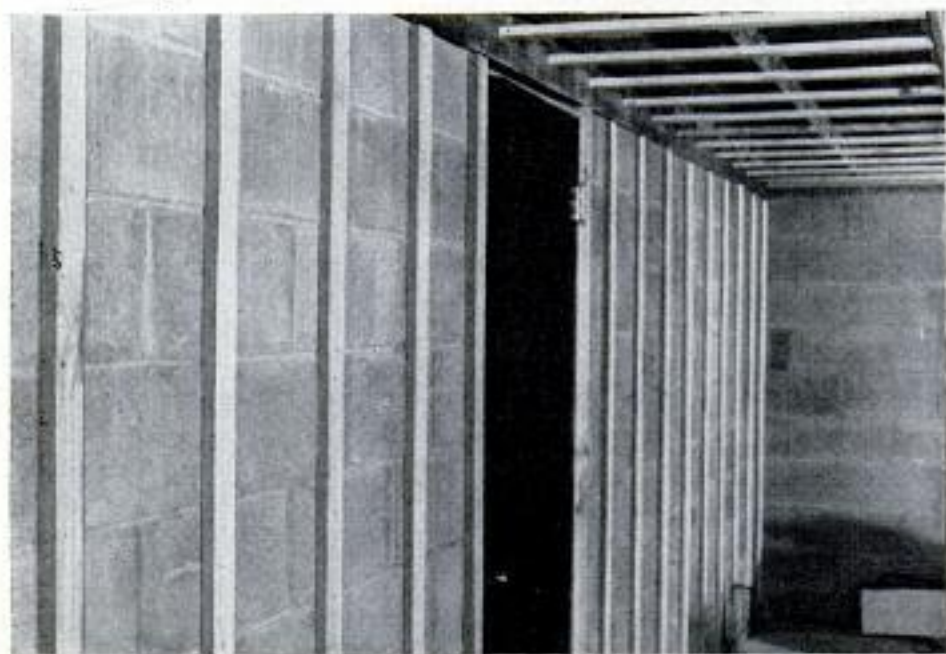


Photo above shows the combination tool being pulled from its niche in the wall cabinet. The two sets of double doors swing wide to provide clearance for the power tool. Photo at right shows tool in use within seconds of its removal from cabinet



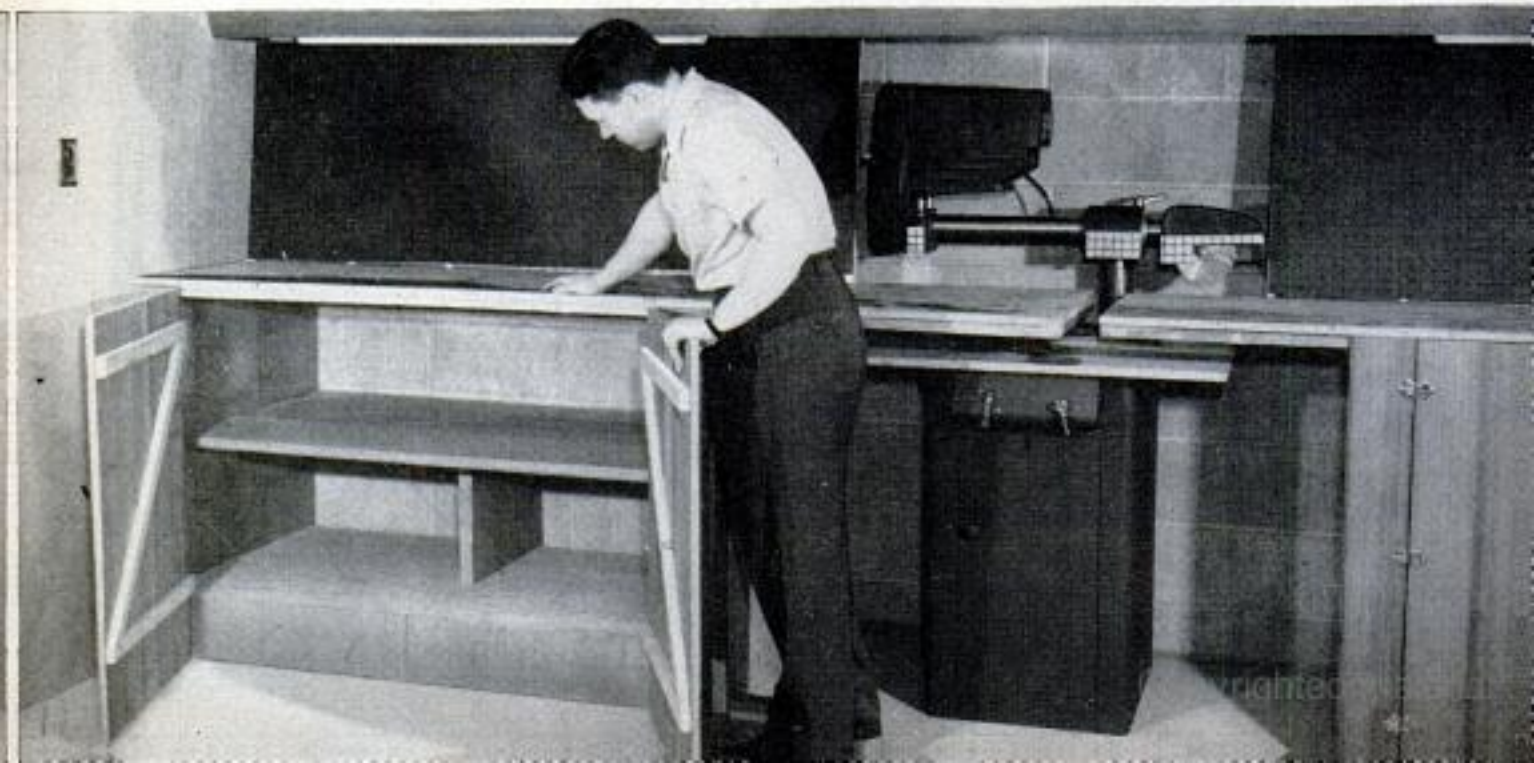


Boxing along both sides of room is used to conceal ducts and water pipes without lowering entire ceiling



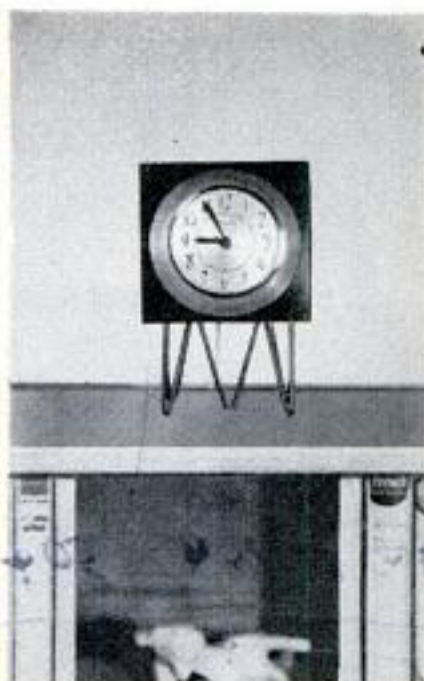
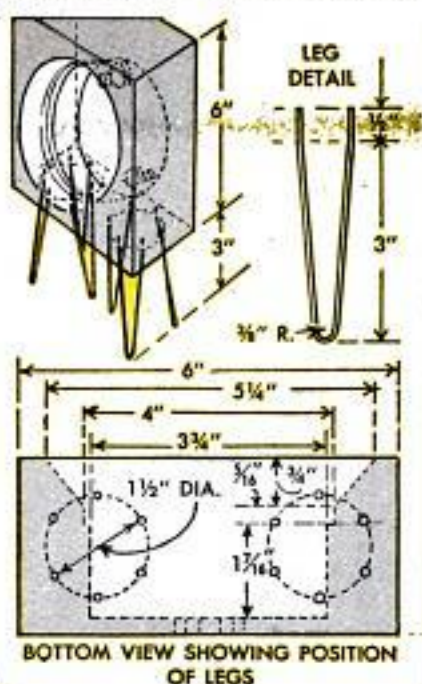
Before installing wood paneling over the concrete-block walls, it was necessary to fur out the walls with strips of 1 x 2. These were fastened to the block vertically, 16 in. apart

Simple cabinet construction can be seen from photo below. Note center shelf support and Z-bracing on doors



Works Salvaged From Broken Kitchen Clock Fitted in Modern Case

When the plaster case around an electric kitchen clock was broken, one home craftsman salvaged the face and motor of the clock and used them in a case of his own design, which was made from a block of hardwood and a length of coat-hanger wire. The wood block, $2\frac{3}{4}$ in. thick and 6 in. square, was recessed $2\frac{1}{2}$ in. deep x $3\frac{3}{4}$ in. in dia. in a lathe, the front edge of the recess being offset and beveled, as shown in the detail, to receive the face of the clock. Openings then were drilled in the back of the case to accommodate the knobs for starting and setting the clock. The 6 "hairpin" legs were shaped from coat-hanger wire and cemented in holes drilled in the bottom of the case. The



method of locating the legs is shown in the lower diagram of the detail.

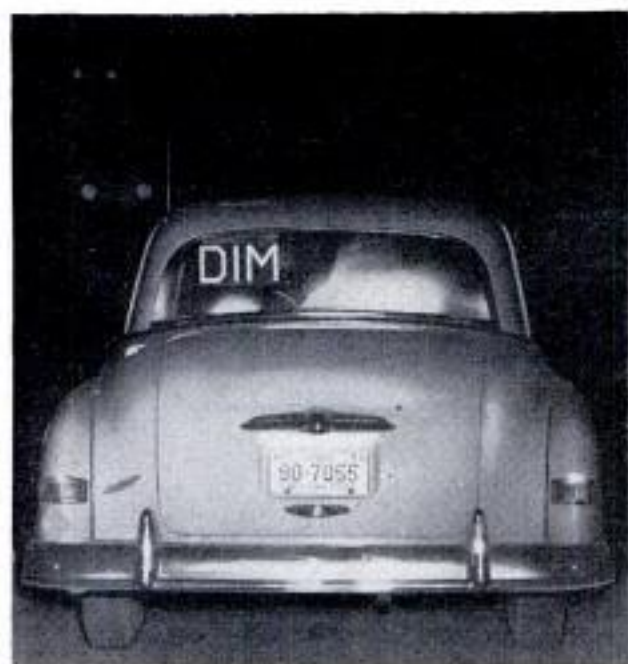
Frank M. Clemmons, Churchland, Va.

Reflective-Tape "Dim" Sign Inside Rear Window Aids Night Driving

When driving at night are you sometimes bothered by the bright lights of the car behind you? Install a reflective-tape sign inside the back window that shows DIM in 5-in.-high letters to the offending driver. The sign is a sheet of light plastic, 6 x 12 in.,

hinged to the top of the window frame. Various types and models of cars will, of course, require different installations. On the original design the sign was controlled by a choke cable which was fished through the roof liner and down the windshield post. The control knob on the end of the cable was located on the dash. A pull on the control causes the sign to swing down and become visible in the rear window. The bright lights of the car behind make the sign brightly visible for 60 or 70 yards.

Lewis C. Debo, Ottumwa, Iowa.

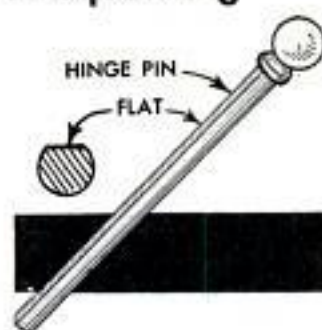


Ⓞ A discarded ice-cube tray from a refrigerator can be used as a storage box for fish-hooks, flies and other small tackle. Since such trays do not rust, the tackle can be placed in them while still wet.

Flat Filed on Door-Hinge Pin Removes Cause of Squeaking

If oiling fails to quiet a squeaky door hinge, file a shallow flat the length of the hinge pin. Squeaking is caused by a slight misalignment in the hinge or a pin that fits so tightly that oil will not

flow along it. The flat will relieve the misalignment and allow oil to flow the full length of the pin. After this has been done the hinge will require lubrication less frequently, since the flat will act as an oil reservoir.



PLAN of the MONTH...



Step Table
PLANS # 104 50¢

Full-size patterns for these projects are available for only 50c each. You merely trace the design on your wood, saw and assemble. Order from Popular Mechanics Press, 200 East Ontario St., Chicago 11, Ill.

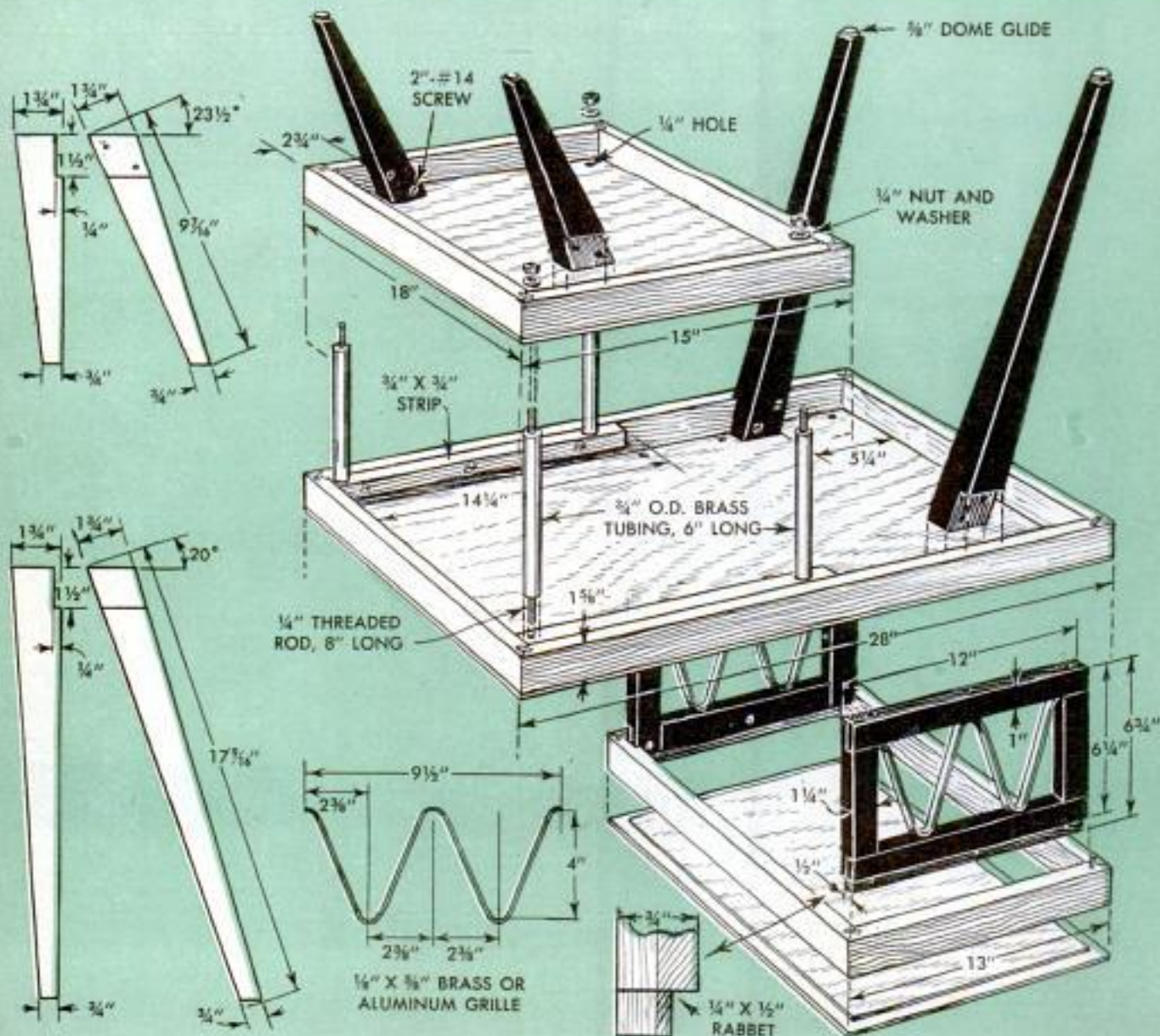
MATERIAL LIST

Plywood

- 1 pc.— $\frac{1}{4}$ " x $18\frac{1}{8}$ " x $13\frac{1}{8}$ "—Top
- 1 pc.— $\frac{1}{4}$ " x $18\frac{1}{8}$ " x $28\frac{1}{8}$ "—Step top
- 1 pc.— $\frac{1}{4}$ " x $18\frac{1}{8}$ " x $15\frac{1}{8}$ "—Shelf

Lumber

- 6 pcs.— $\frac{3}{4}$ " x $1\frac{1}{2}$ " x 18"—Front and back rails
- 2 pcs.— $\frac{3}{4}$ " x $1\frac{1}{2}$ " x 13"—Top side rails
- 2 pcs.— $\frac{3}{4}$ " x $1\frac{1}{2}$ " x 28"—Step side rails
- 2 pcs.— $\frac{3}{4}$ " x $1\frac{1}{2}$ " x 15"—Shelf side rails
- 4 pcs.— $\frac{3}{4}$ " x $1\frac{1}{4}$ " x 7"—Posts
- 2 pcs.— $\frac{3}{4}$ " x 1" x 12"—Bottom frame rails
- 2 pcs.— $\frac{3}{4}$ " x $1\frac{3}{4}$ " x 12"—Top frame rails
- 2 pcs.— $\frac{3}{4}$ " x $\frac{3}{4}$ " x $14\frac{1}{4}$ "—Post cleats
- 2 pcs.— $1\frac{3}{4}$ " x $1\frac{3}{4}$ " x $9\text{-}7/16$ "—Front legs
- 2 pcs.— $1\frac{3}{4}$ " x $1\frac{3}{4}$ " x $17\text{-}9/16$ "—Back legs
- 12 pcs.— $\frac{1}{8}$ " x $\frac{1}{2}$ " x $1\frac{1}{2}$ "—Splines



Modern Tables

WTM 56
 &
 Modern Furniture

MATERIAL LIST

Plywood

2 pcs.— $\frac{1}{4}$ " x $19\frac{1}{8}$ " x $40\frac{1}{8}$ "—Top and shelves

Lumber

4 pcs.— $\frac{3}{4}$ " x $1\frac{3}{8}$ " x 19"—End rails

4 pcs.— $\frac{3}{4}$ " x $1\frac{3}{8}$ " x 40"—Side rails

8 pcs.— $\frac{3}{4}$ " x $1\frac{1}{4}$ " x $6\frac{3}{4}$ "—Posts

4 pcs.— $\frac{3}{4}$ " x 1" x 10"—Bottom side frames

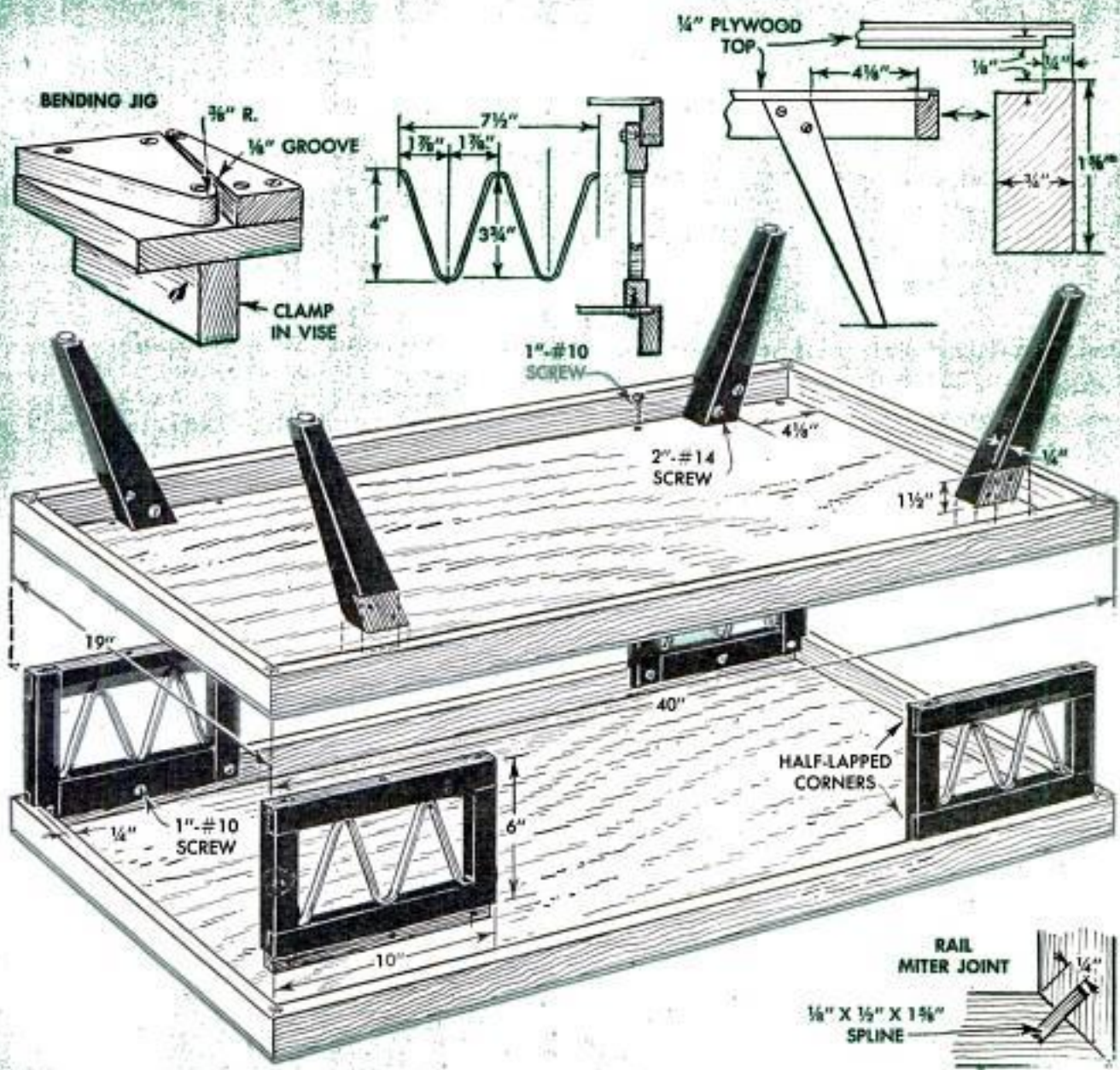
4 pcs.— $\frac{3}{4}$ " x $1\frac{3}{4}$ " x 10"—Top side frames

4 pcs.— $1\frac{3}{4}$ " x $1\frac{3}{4}$ " x $9\frac{7}{16}$ "—Legs

8 pcs.— $\frac{1}{8}$ " x $\frac{1}{2}$ " x $1\frac{1}{2}$ "—Splines



PLANS # 103 .50¢
 Cocktail Table



T-Square Used on Blackboard To Chalk Parallel Lines



A perforated T-square will provide a simple means of chalking horizontal lines on a blackboard. A number of equally spaced holes are drilled in a length of $\frac{1}{2}$ x 2-in. stock. A shorter piece of the lumber is screwed at right angles to one end to provide the crossbar of the T-square. In use, the crossbar is slid along the upper frame of the blackboard while the chalk is held in one of the drilled holes.

Balloon-Tired Wheel for Models Formed From Rubber Ball



Various sizes of rubber-tired wheels for toys and models can be made by fitting an axle through children's hollow or sponge-rubber balls. A hole is punched through the middle of the

ball to receive the axle, which is either a machine screw or threaded round stock

Foam-Rubber Upholstering

Foam rubber and sagless-type springs enable almost anyone to do upholstery jobs of a professional quality. Whether used for reupholstering your present furniture or for finishing a new piece, this combination will give wonderful comfort, a smooth appearance and long wear. It's all surprisingly easy, as you will discover in the fully detailed article in next month's issue

fitted with nuts. A washer or sheet-metal disk is fitted on the axle on each side of the ball to form the wheel. When the nuts are tightened against the washers the rubber ball will swell to form a realistic balloon tire.

Acidproof Plug in Glass Jug Is Rubber Sink Stopper

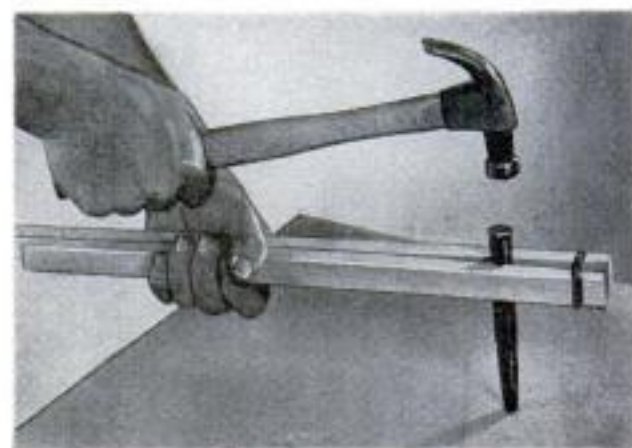
A rubber sink stopper will seal a glass jug tightly and is not subject to deterioration from acids, as are the usual corks or metal screw caps. Misplacing the stopper is prevented by attaching it to the handle of the jug with a rubber band cut from an inner tube. A metal chain may be used if the jug contains some liquid that is noncorrosive.



G. E. Hendrickson, Argyle, Wis.

Holder Prevents Hand Injury When Using Cold Chisel

Protection for your hand when using a cold chisel may be provided by a holder made from two lengths of 1-in. stock and a heavy rubber band. Each length of stock is beveled on the inside surface near the end and a notch is cut 3 in. from the end to receive the chisel. A shallow notch on the outside of each strip keeps the rubber band in place. The chisel is held by gripping the two lengths of stock near the ends, as shown in the photograph. Rounding the corners of the stock will make a more comfortable handgrip. A claw hammer, as shown in the photograph, may be used for light work, but a ball-peen hammer is preferable for all work.



HOW TO INSTALL A VENT FAN IN YOUR KITCHEN

Installing a kitchen fan is a simple do-it-yourself job that any handy homeowner can do himself with a few common tools

DO YOU KNOW that as much as a pound of grease a day is deposited on the walls and ceiling of your kitchen? Every time food is cooked, minute droplets of grease attach themselves to the vapors given off. As soon as these vapors come in contact with a cooler object or surface, they condense, leaving a greasy deposit. Without a means of expelling these grease-laden vapors, the grease is absorbed by draperies, upholstery and clothing and settles as a film on the walls, woodwork and cabinets in the kitchen.

Besides keeping the kitchen cleaner and decorating bills lower, a ventilating fan makes the kitchen a more pleasant place to work by ridding the room of odors. In hot weather, it is much appreciated for its fast action in exhausting the excess heat produced from cooking, and for its effect in cooling the room in general.

There are two general types of kitchen fans on the market—wall and ceiling. Some can be converted for either use. The wall type has the advantage that it can be placed



very close to the range. But where there is no wall space over the range, a ceiling-type fan often can be used to better advantage. This is true also where the range is located on an inside wall, as it will require less ductwork to vent a ceiling fan than it would to vent a wall fan located on an inside wall.

A third installation that might be preferred is in a kitchen cupboard or stove hood. In such an installation, the fan is mounted in a horizontal position in the bottom of the cupboard and vented with a

TYPICAL OF THE VARIOUS VENT FANS on the market are those pictured below. This representative group includes both wall and ceiling models, as well as propeller and full-pressure types. All are easy to install

Pryne and Co., Inc.



NuTone, Inc.



American Blower Corp.



H.G. Electric Co.



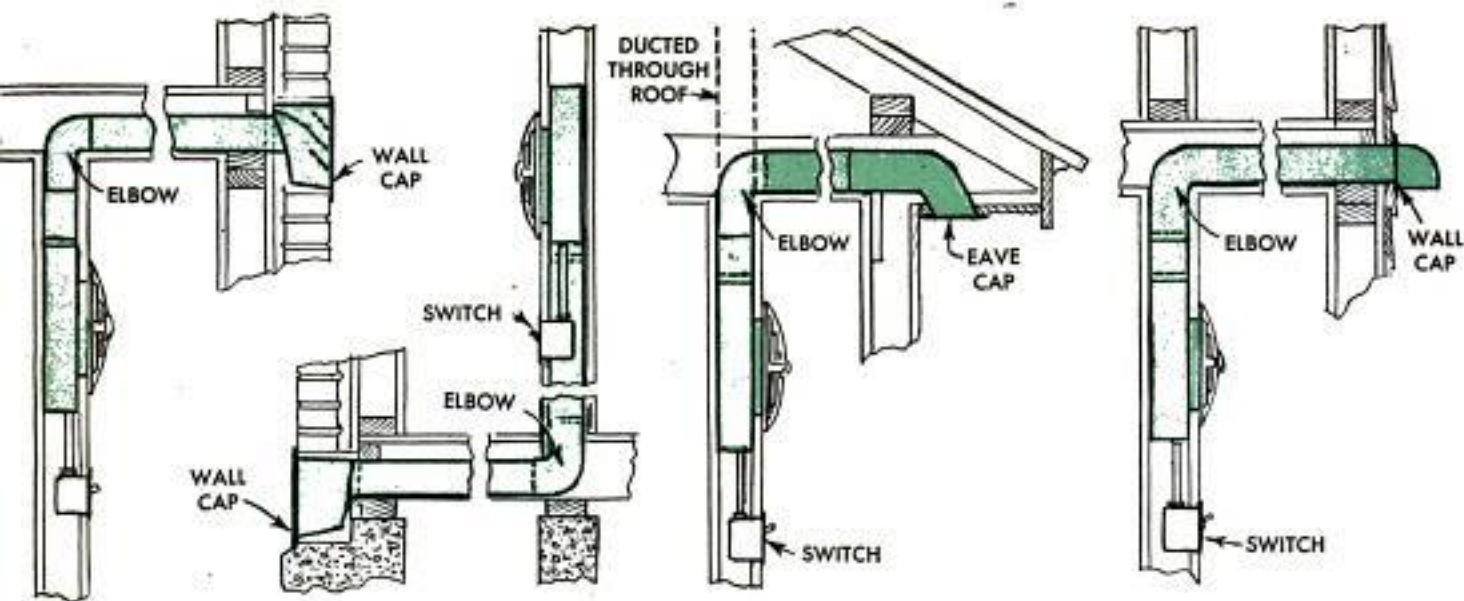
Stewart Industries, Inc.



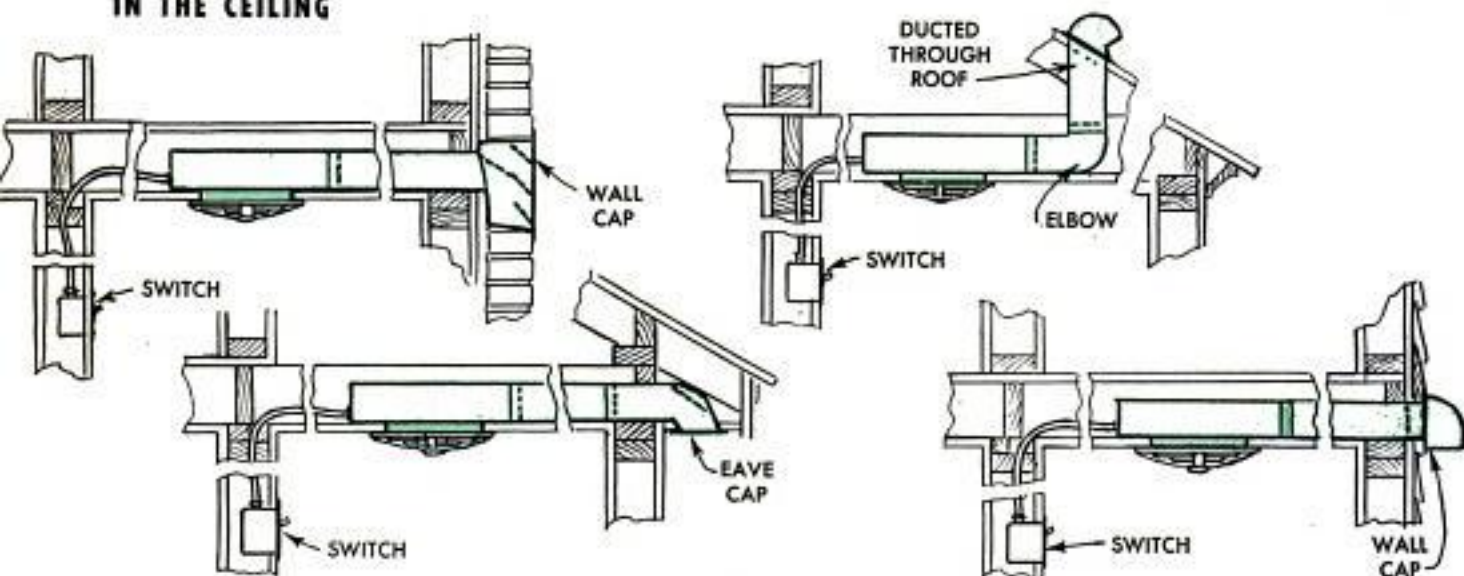
NuTone, Inc.



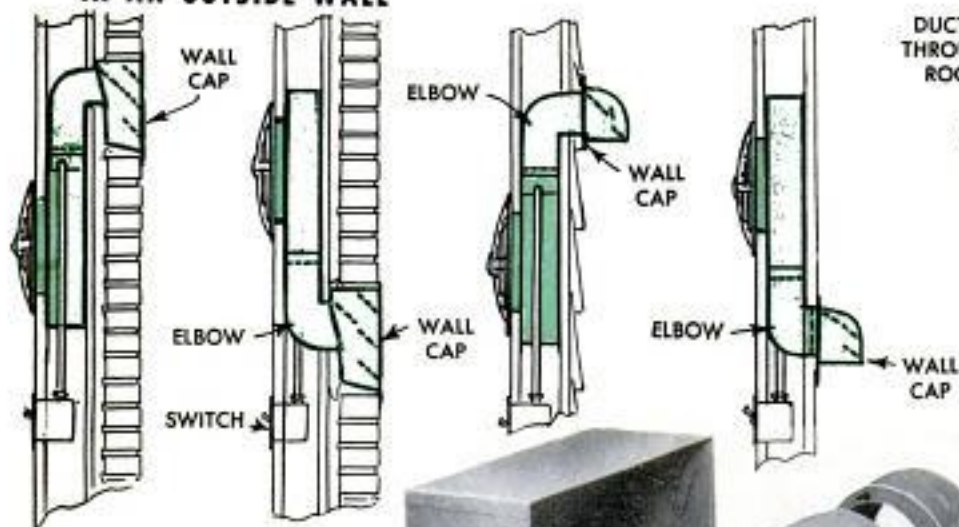
IN AN INSIDE WALL



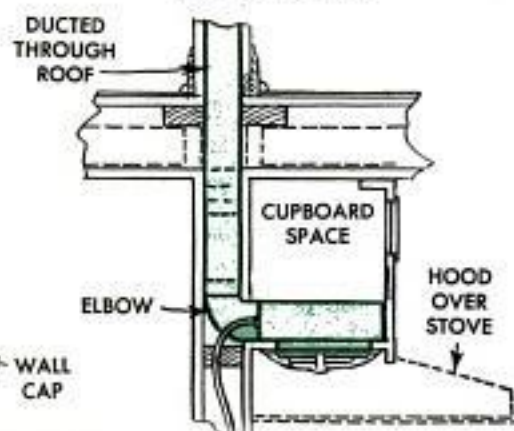
IN THE CEILING



IN AN OUTSIDE WALL



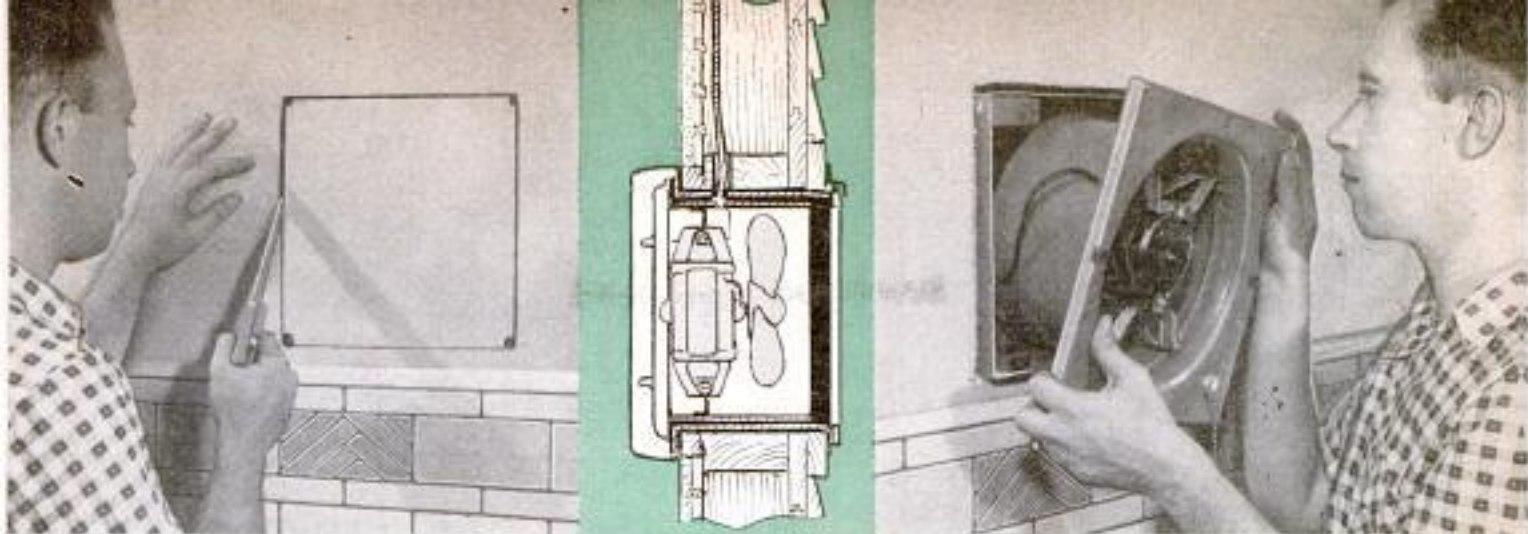
IN A CABINET



Right, component parts of compact "twin blower," full-pressure fan. Ideal for cabinet or hood installation directly over kitchen range. Fan may also be ceiling mounted



Photo courtesy NuTone, Inc.



Photos show steps in mounting typical fan in outside wall. Square sheet-metal outer housing, containing lift-up door and built-in switch, bolts to fan assembly in pillbox fashion. Features plastic grille

duct running up through the wall. You can buy a compact "twin blower" pressure-type fan ideally suited for cabinet installation, although some wall and ceiling-type fans can be adapted.

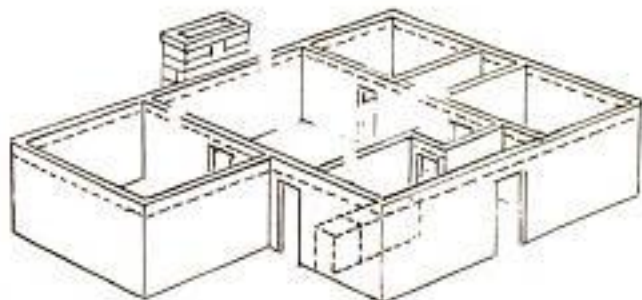
One manufacturer has recently offered a unit designed for multiple ventilating. Here, an 800-c.f.m. fan is mounted outside the house, either on the roof or wall, where it pulls from one, two or three separate grilles located in different rooms. Thus, any combination of rooms can be served, such as kitchen only, kitchen and utility room or kitchen, bath and game room.

The best location for a fan is to have it as close as practical to the range since its most important function is the removal of grease-laden vapors. If it is possible to mount the fan in a wall, it should be located 12 to 18 in. above the top of the range. This is an exceptionally good location, especially if it should happen to be an outside wall, as no duct work is required to vent it. Even if the range is located on an inside wall, but only a few feet from an outside wall, it is still more practical to install the fan on the outside wall. It will save a lot of work, and perform just as satisfactorily.

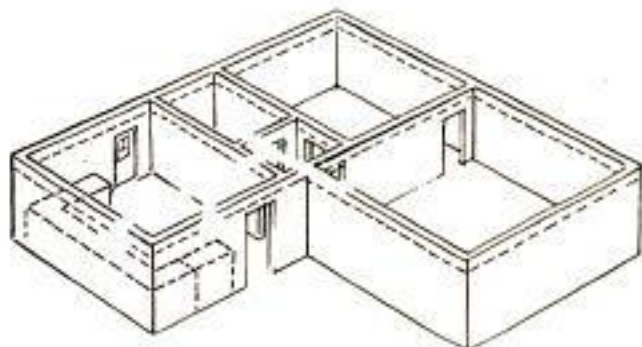
Where a ceiling installation is more practical, the fan should be located so not more than 10 ft. of duct work is required to vent it to an outside wall. If a ceiling fan is installed in a one-story house, it can be vented through the roof with a vertical run of pipe fitted with a regular sheet-metal



American Blower Corp. photo

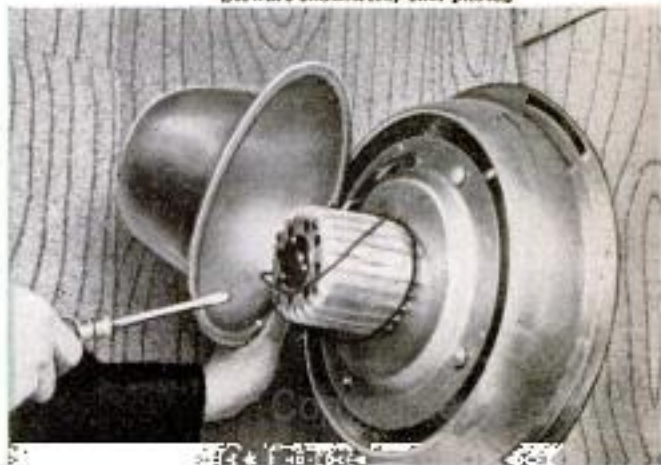
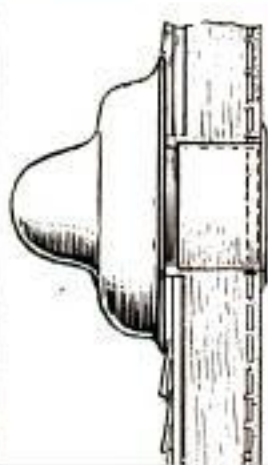
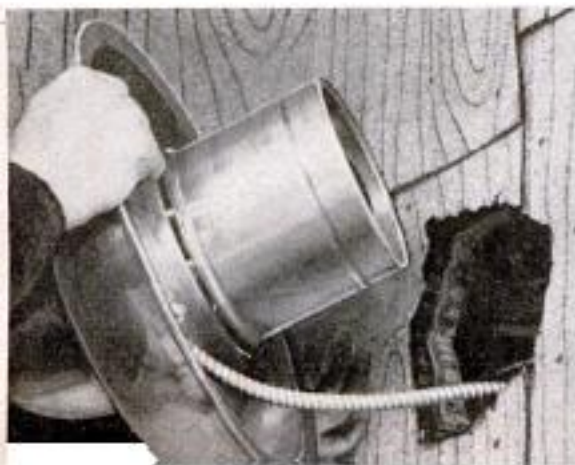


New multiple-ventilating idea permits one, two or three rooms to be ventilated with a single fan mounted outside the house, either on the roof or a side wall



Below, this particular type of fan differs from others in that motor and blade are actually outside house in weatherproof casing. Makes for quiet operation

Stewart Industries, Inc. photos





Periodic cleaning of this 10-in. ceiling fan requires unscrewing single thumb bolt to remove grille, unplugging fan and lifting out latter as shown below



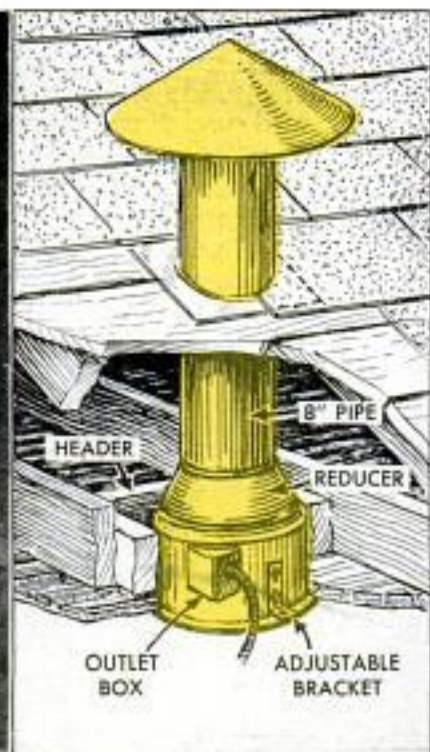
Below, reducer capping top of housing takes standard 8-in. furnace pipe to vent fan through roof as in drawing at right. The reducer has back-draft damper

vent cap. This type of installation is shown being made on page 216. Here you see that a minimum of ductwork is required and, consequently, the job is less expensive.

In deciding on location, keep in mind that the best pattern of air movement in a kitchen is to have the air sweep across the range on its way to the fan. Thus, if it is not practical to locate the fan directly above the range because of wall cabinets, locate the fan so that air will pass over the range before getting to the fan. Keep in mind also that air entering the kitchen should come from other rooms of the house rather than from an open window or door. Where a fan is located on an outside wall and near a door or window, keep it closed when the fan is operating. Otherwise, air will be drawn in through the open window or door and be "short circuited" out again via the fan without ventilating the kitchen.

In selecting the right-sized fan for your particular kitchen, you should first decide how fast you want the air to be replaced with fresh air. The Power Fan Manufacturers' Association recommends that the air should be changed completely once every two to three minutes. This means that if a kitchen should contain 1200 cu. ft. of space and you want a 3-min. air change, a fan rated at 400 c.f.m. should be selected; a 2-min. air change would require a fan capable of delivering 600 c.f.m. The 2-min. rate is often recommended for a small kitchen where a faster rate of air exchange would trap odors before they have a chance to spread to other parts of the house. Regardless of how small a kitchen might be, a fan rated at 300 c.f.m. should be absolute minimum for efficient ventilation.

Installing a fan, either wall or ceiling



type, is a fairly simple job, particularly when it is located in an outside wall, or in a ceiling and vented through the roof. Obviously, more work and expense are involved in running duct work up through an inside wall of an existing house. Obviously, too, it is an easier job where the wall is frame, rather than brick. In laying out the opening in a frame wall, try to locate it so that a stud will form one side of the opening. Since both the inside and outside openings must be in line, a good way to assure this is to use a cardboard pattern cut to the required size and shape. This is taped in place to the plaster and a line is drawn around it. Then a hole is drilled through the center of the pattern and right through the outside wall. After this, the cardboard pattern is taken outside, registered squarely over the hole in the wall, taped in place and marked as before. A hole is bored in each corner of the square for sawing out the openings with a keyhole saw. This step is shown being done at the top of page 215 for installing an Aeropel fan. If metal lath is encountered in sawing through the plaster, use a hacksaw blade.

Most kitchen fans are equipped with a sheet-metal wall box, or sleeve, and an outlet section fitted with a door that mounts flush to the exterior wall. Additional wooden trim or frame may or may not be needed. For those fans that do require a frame, a simple one of 1 x 2 strips can be made, mitering the pieces at the corners and nailing them together with corrugated fasteners. In fitting the frame in place, trim back the siding, or shingles, as the case may be, around the opening to permit the frame to fit flat against the sheathing. Where a frame is not needed, but the outlet box has a flange, this same procedure is used. Calking around the flange, in both frame and brick walls, provides a positive seal.

Some fan units slip together like a "pill-box," one inside the other, and it is therefore important to see that the outer section is squared up properly. Otherwise, the grille on the inside will be out of square. When mounting the fan unit inside the outer section, make certain that the wall



The Vent-A-Hood Co. photo

Vented canopy projects over range to effectively trap cooking vapors. Protects back wall from grease splattering. Has built-in light and exhaust fan. Comes knocked down for installation between wall cabinets

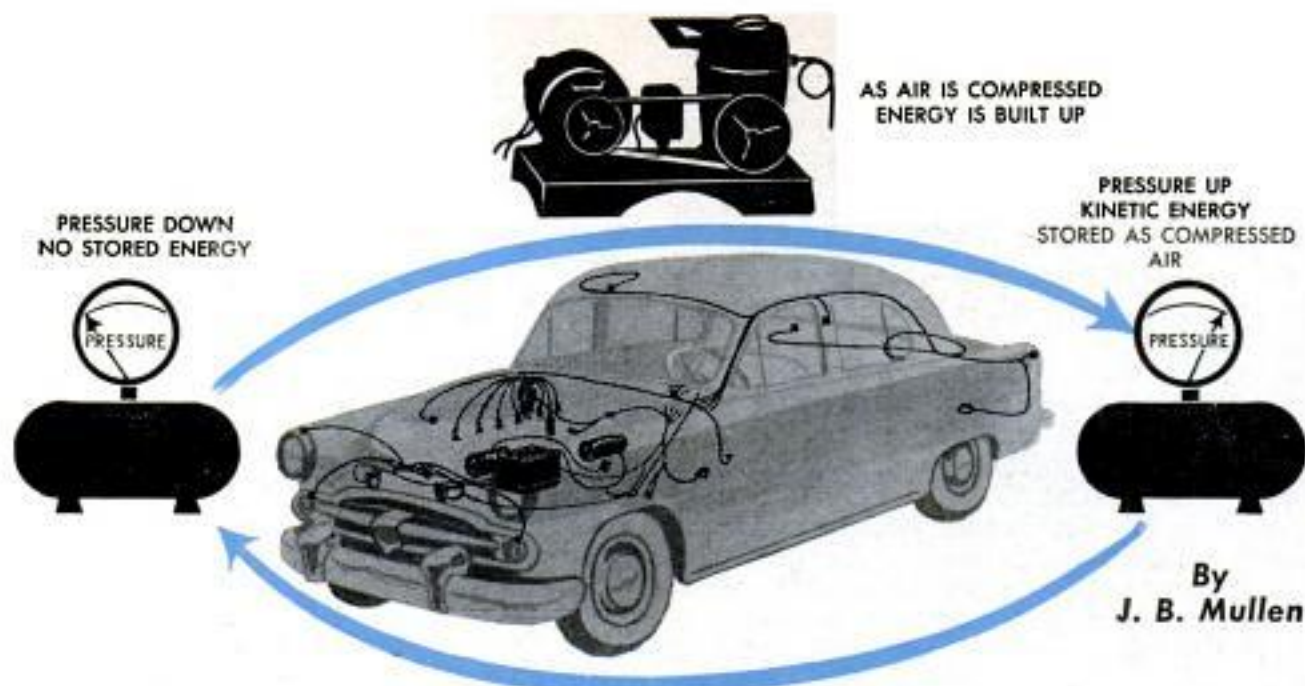
flange is adjusted to the plaster line so the flange and grille will fit securely against the wall. Improper adjustment here may cause noisy operation due to vibration.

A typical ceiling-fan installation is shown in the cutaway drawing on the opposite page. This particular fan (NuTone) has a tubular sleeve or flanged housing which is held against the ceiling by sheet-metal ears (L-shaped brackets) attached with sheet-metal screws to the outside of the housing. A reducer, containing a back-draft damper, is supplied to fit the top of the housing for venting the fan through the roof with ordinary 8-in. galvanized pipe. The motor-and-fan unit is suspended inside the housing on rubber bushings. By tightening a center thumb bolt which secures the grille, the motor unit is seated securely in position. The motor plugs into a built-in receptacle inside the housing which makes it easy to remove the motor-and-fan unit for periodic cleaning. As a rule, ceiling-type fans operate from a wall switch, whereas a good many wall-type fans are controlled with a pull chain which opens the outside louver and turns the fan on at the same time. ★ ★ ★

Photo Prints Straightened With Rubber Pad and Dowel

Curled prints can be straightened by using a sponge-rubber pad, a wooden dowel and a block of wood. The print is placed on the pad, face down; then the dowel is rolled across it with one hand while pressure is applied with the block of wood held in the other hand. Some practice is required to determine how much pressure to apply and how long to roll the dowel. *Caution:* Papers with extremely brittle emulsions may be cracked by this method.





YOUR CAR BATTERY—How It Works

WHEN YOU SERVICE your car don't forget the battery, either summer or winter. It's easy to overlook the battery as it never attracts attention due to unusually noisy operation or other warning of impending failure. It will need periodic cleaning to neutralize the acids that may corrode terminal posts, cable connections and the metal rack in which it is supported. It will need a "shot" of distilled water in each cell once every two or three weeks during the summer months. In cold weather you will need to keep a careful check on the generator charging rate to make sure it is maintained at full charge. If the battery becomes discharged it may freeze in cold weather. Note readings and temperatures in Table I.

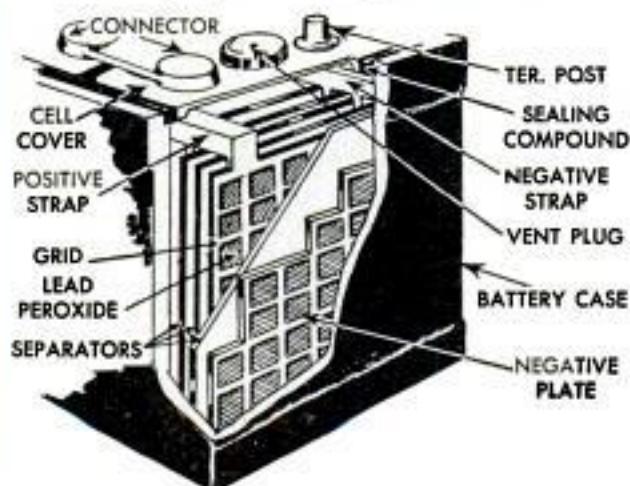
The lead-sulphuric-acid storage battery, or secondary battery, is almost universally used in cars. It's simply a chemical plant in a box. It stores chemical energy in the plate materials and releases it as electrical

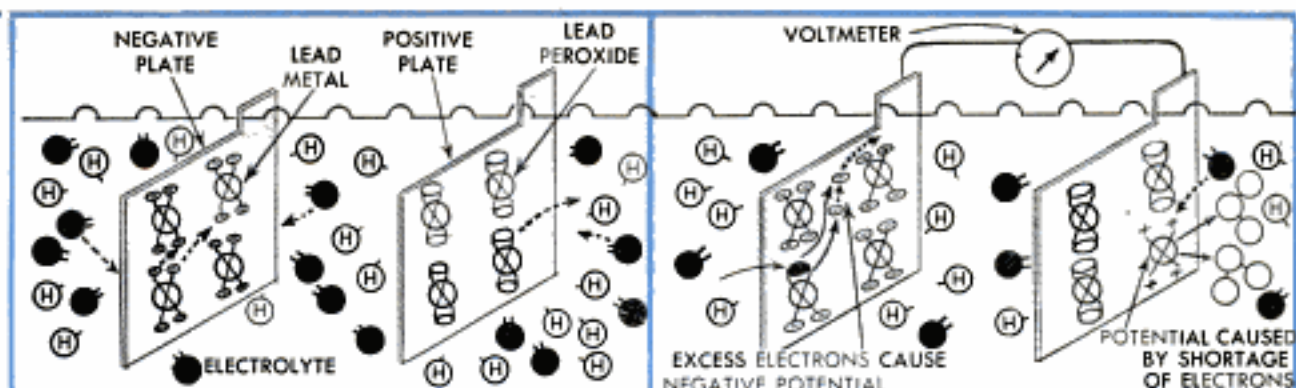
energy as the plate materials go through a chemical reaction. This is diagrammed at the top of the opposite page, stages 1, 2, 3 and 4. Note the movements of the various components in the four stages shown and then compare this with the look into the battery box, or case, that you get in the cutaway view below. The processes are continually reversed; that is, after the battery is discharged, electrical energy can again be stored as chemical energy.

The energy cycle of the battery is comparable in some respects to that of an air-compressing unit. Mechanical energy is stored in air under compression and is later released as mechanical energy by means of any one of a number of devices designed to convert and utilize it. Compare the diagram at the top of page 218 with that at the bottom of page 219 and you will see the analogy between the "energy cycles" of compressor and battery.

Referring again to stages 1 to 4 inclusive

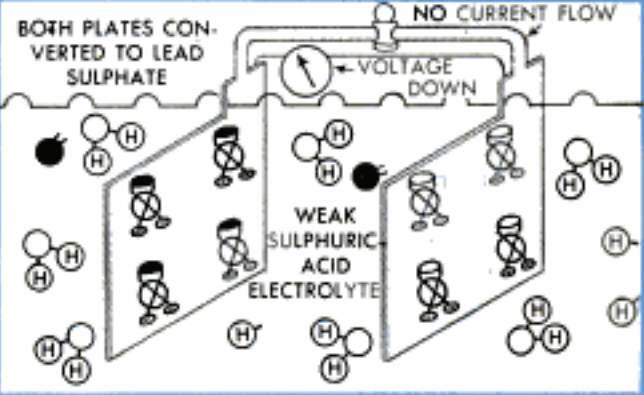
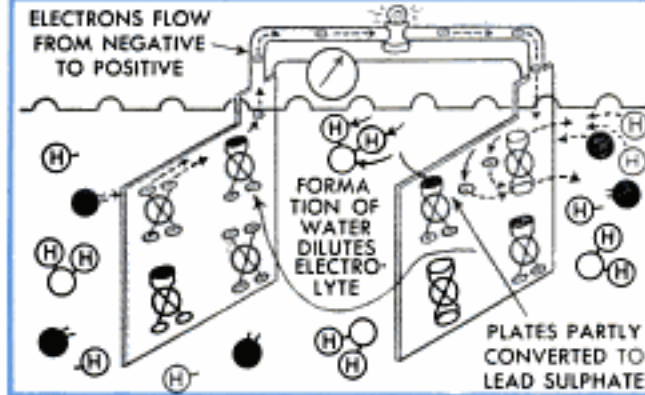
SP. GR. at 60° F.	SP. GR. at 32° F.	FR. PT. in ° F.
1.150	1.162	+7
1.175	1.187	-2
1.200	1.212	-14
1.225	1.237	-32
1.250	1.262	-55
1.275	1.287	-82
1.300	1.312	-95





1 FULLY CHARGED PLATES TEND TO REACT BY COMBINATION OF LEAD WITH SULPHATE IONS

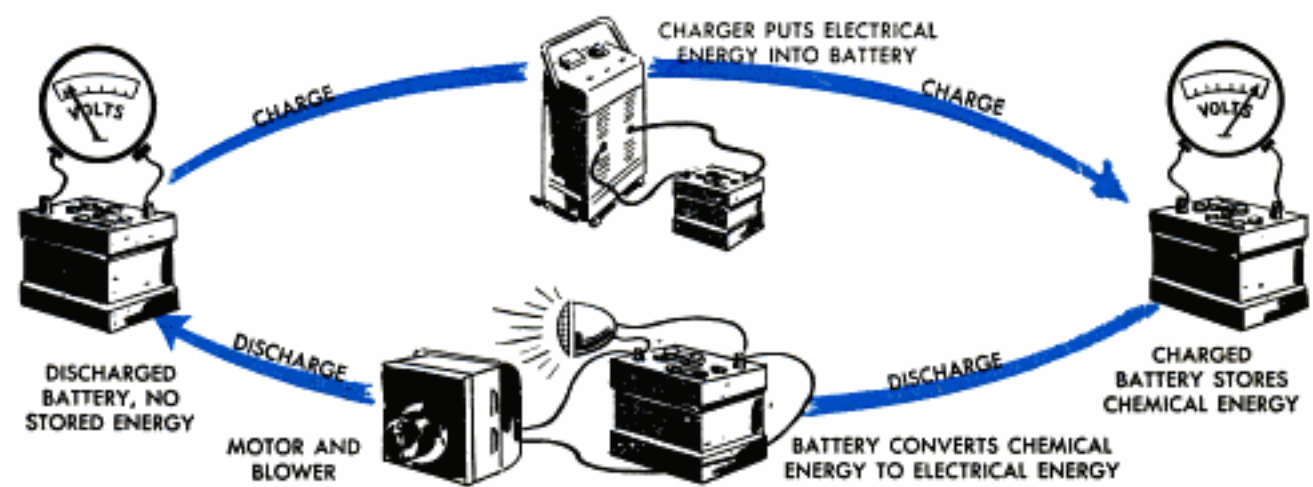
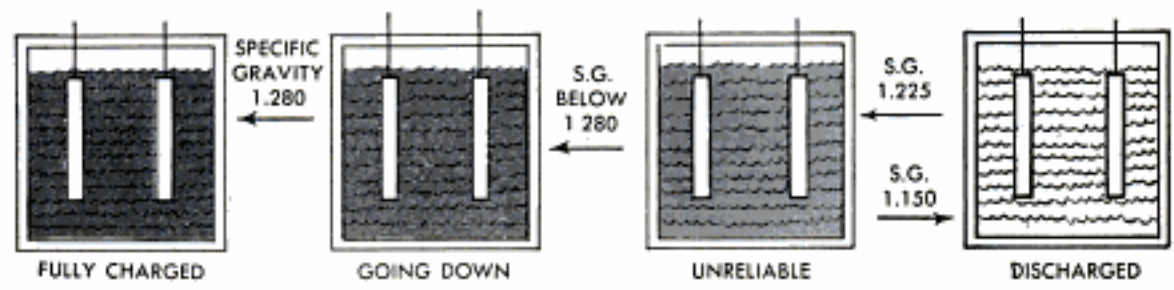
2 SLIGHT REACTION OCCURS. REACTIONS LEAVE PLATES CHARGED, WHICH STOPS REACTIONS

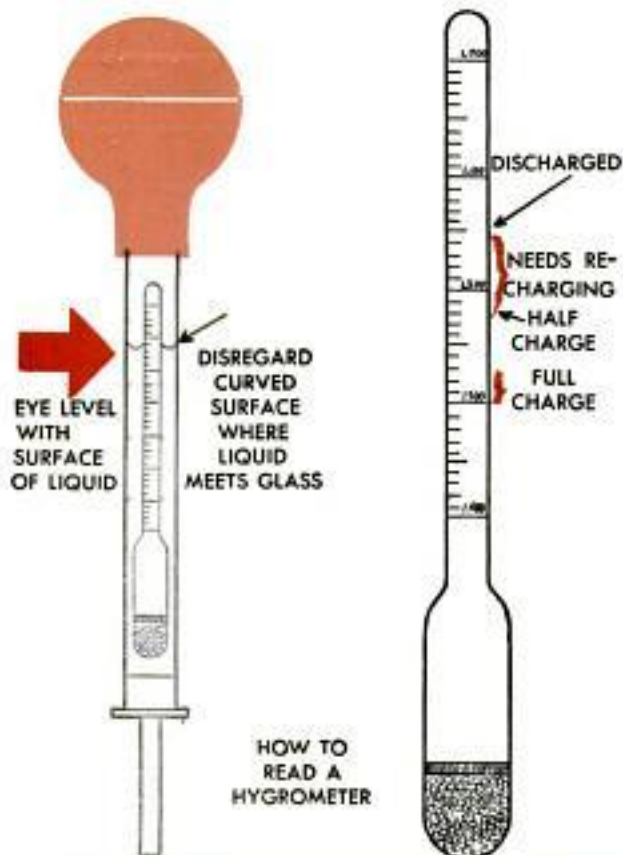
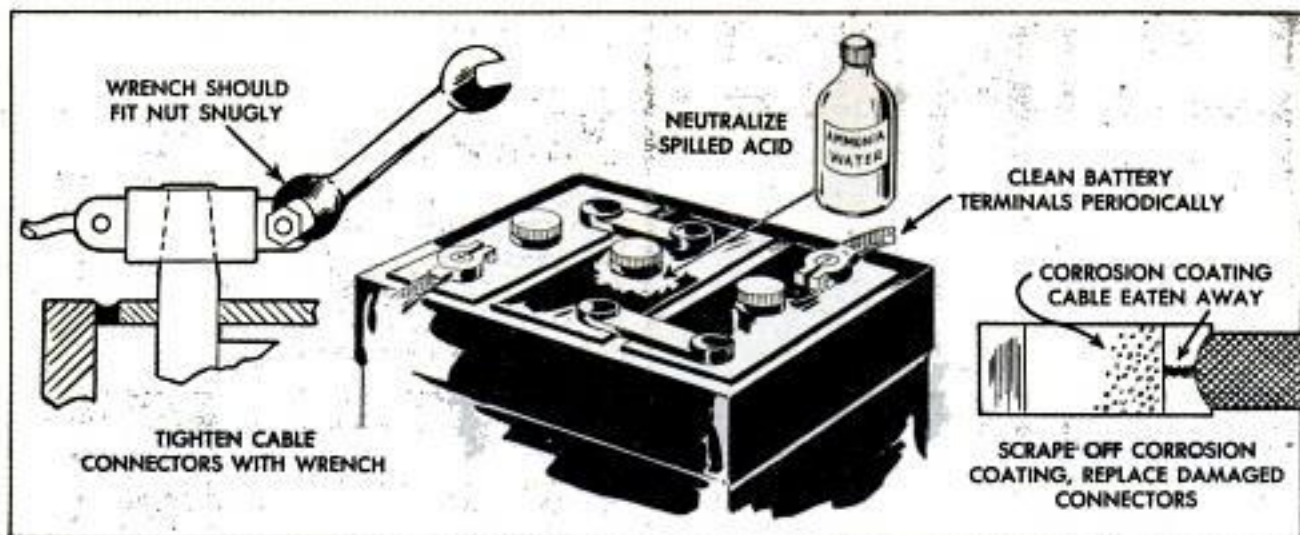


3 CIRCUIT PROVIDES PATH FOR ELECTRONS FROM NEGATIVE TO POSITIVE. REACTIONS CONTINUE

4 BATTERY FULLY CHARGED WHEN ACTIVE MATERIAL IS CONVERTED INTO LEAD SULPHATE

LEAD	UNCHARGED ATOM WITH 4 ELECTRONS		ION WITH 2+ CHARGE (HAS GIVEN UP 2 ELECTRONS)	
ION WITH 4+ CHARGE (HAS GIVEN UP 4 ELECTRONS)	SULPHATE ION WITH 2 NEGATIVE CHARGES		HYDROGEN ION WITH 1 POSITIVE CHARGE	
OXYGEN (COMBINED) WITH 2 NEGATIVE CHARGES	ELECTRON A UNIT NEGATIVE CHARGE		PATH OF PARTICLES DURING REACTIONS	





in the diagram on page 219, note first the symbols and then follow them through the four stages. At the negative plate lead, atoms give up two negative electrons per atom, thus becoming lead ions with two negative charges per ion. The charged lead ions combine with negatively charged sulphate ions in the acid electrolyte to form lead sulphate. The latter is not soluble and remains in position on the plate. The plates thus acquire a negative charge relative to the solution. The amount of this charge and the positive charge on the positive plate are what is meant by the voltage of the cell. Unless the electrons can flow away, the process which has been going on quickly reaches an equilibrium and stops.

When the battery is connected to a load, the electrons on the negative (lead) plate flow through wires and the load. In the meantime, as fast as the electrons leave the negative plate, the equilibrium between lead atoms, ions and electrons is displaced and more lead atoms will give up electrons, become ions and combine with sulphate ions to form lead sulphate. The process continues as long as the load is connected,

	ACTIVE MATERIALS		INACTIVE MATERIALS
ACTION AT POSITIVE PLATE	Lead Peroxide plus 4 Hydrogen ions plus sulphate ion plus 2 electrons $Pb^{2+}O_2 + 4H^+ + SO_4^{2-} + 2e^-$	yields	Lead Sulphate plus 2 Water $Pb^{2+}SO_4 + 2H_2O$
ACTION AT NEGATIVE PLATE	Lead plus Sulphate ion $Pb^+ + SO_4^{2-}$	yields	Lead Sulphate plus 2 electrons $Pb^{2+}SO_4 + 2e^-$
OVER-ALL REACTION	Lead plus Lead Peroxide plus 2 Sulphuric acid $Pb^+ + Pb^{2+}O_2 + 2H_2SO_4$	yields	2 Lead Sulphate plus 2 water $2Pb^{2+}SO_4 + 2H_2O$

The reactions that take place in a storage battery cell on discharge. The reactions on discharge are the reverse of the reactions on charge, and the inactive materials are restored to the active form

Small +, -, and * signs above symbols for lead and other materials represent sign and number of charges on ions and show change of charge in course of reactions

or as long as there are uncombined lead atoms on the negative plate to give up electrons.

Similar processes are taking place at the positive plate. Lead peroxide consists of oxygen combined with lead which has already lost four electrons per lead atom when the lead peroxide was formed. These highly charged lead ions (four positive charges) take up two negative electrons each, becoming ordinary lead ions with two positive charges which combine with sulphate ions to form lead sulphate. Oxygen of the lead peroxide combines with hydrogen ions from the electrolyte to form water. The discharge reactions end with the reactive material of both the positive and negative plates converted to lead sulphate. Complete cell reactions are given in the table on the opposite page. Also note the four stages shown in the center view on page 219, from fully charged to complete discharge.

On recharge, the chemical changes are reversed. Current from the generator or charger delivers electrons to the negative plate. These convert the positively charged lead ions of the lead sulphate back to metallic lead, freeing the sulphate ions, which go back into solution. At the same time the lead ions in the lead sulphate on the positive plate give up electrons again and are converted to lead dioxide with the sulphate ions going back into solution. When the charge is completed the plates are back in the original condition.

The battery is built to withstand repeated charge and discharge cycles and will give regular service as long as the active material remains in place on the plates with its porous structure unchanged. Keep a periodic check on the condition of the electrolyte with a hydrometer as in the center detail on the opposite page. Be sure that you read the hydrometer correctly in order to determine the exact reading. At full charge the reading may vary between 1.270 (or 1.280) and 1.300. If the reading is much below 1.270, say 1.225, the battery is unreliable and needs recharging. The charging rate of the generator should be checked and readjusted immediately. Also, check the level of the electrolyte in each cell and add distilled water if necessary to bring the level of the liquid above the plates. While you're at it, check the cable connections with a wrench as in the details at the top of the opposite page. Be sure the wrench fits the clamp nut snugly. Scrub the top of the battery and its metal holder, or support, with ammonia water. Replace corroded cables. Coat metal parts with petroleum jelly. Be sure battery is tight in holder. Check the clamping bolts and, if necessary, renew rubber washers. ★ ★ ★

Fiberglas-Plastic on Boat Deck Replaces Painted Canvas



One of the newest materials to be used for waterproofing the decks of cabin cruisers is Fiberglas-reinforced plastic. The old canvas is first removed, a coat of resin is applied and the Fiberglas cloth then is smoothed onto the resin-coated surface. A second coat of resin is applied over the cloth to finish the job. In some instances, two or three layers of the cloth impregnated with the resin are advisable for additional strength.

Drum Attached to Belt Sander Provides Dual-Purpose Machine

A small-diameter sanding drum, coupled to the drive shaft of a belt sander, permits sanding sharply curved surfaces on which the flat belt cannot be used. A regular shaft coupling is used to connect the drum to the drive shaft of the sander. Some modification of the coupling may be required to fit it to the shaft.





Coil Springs Provide Tension To Guide Lines on Blinds

Large, slatted blinds used on screened-in porches can be prevented from flapping noisily in the wind by fitting coil springs to the top ends of the guide lines. The springs are hooked to shelf brackets which hold the lines out from the wall slightly less than the diameter of the rolled screen. The bottom ends of the guide lines are fitted with S-hooks which engage screw eyes driven into the wall near the floor.

Blow Dust From Your Negatives



Dust can be removed from a negative without danger of scratching by blowing through a glass drinking straw and directing the concentrated jet of air over the surface of the negative. When the air in the dark-room is dry enough to cause a static charge to build up on the surface of negatives, causing them to curl and

become hard to handle, your breath through the straw, because it is humid, will clear it away.—Robert C. Florian, Chicago.

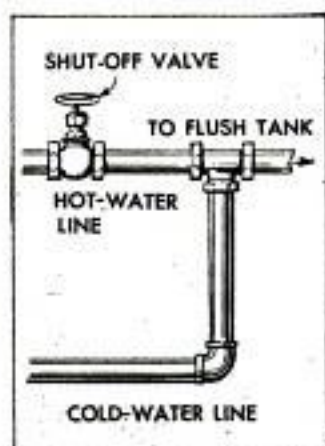
Wood Filler Mixed as Needed

One craftsman makes nonshrinking filler by mixing powdered whiting, 3 parts, and powdered resin-type glue, 1 part. The mix-

ture is inexpensive and can be stored for a long time without deterioration. When needed, water is added to make a paste. The filler does not shrink and color may be added to it to match the wood on which it is used.—Rudolph Sacchetti, Baltimore, Md.

Flush-Tank Sweating Prevented By Supplying Heated Water

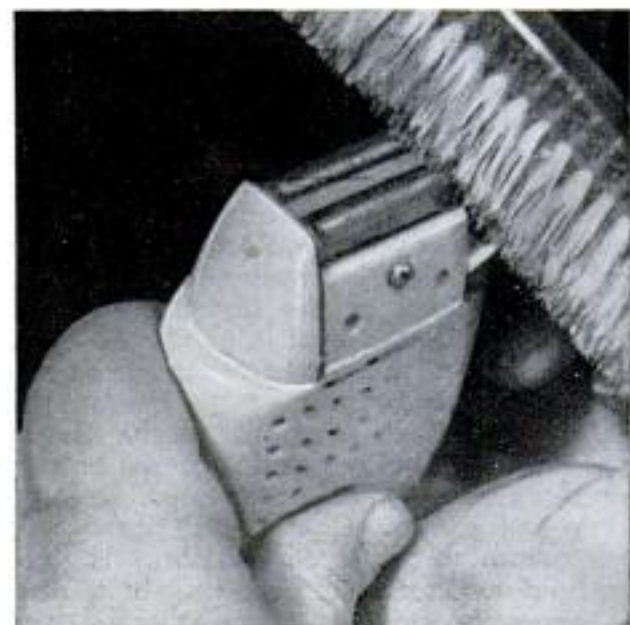
The problem of a sweating flush tank can be overcome by heating the water in the tank to room temperature or slightly above. Where a constant supply of hot water is available, a mixture of hot and cold water can be piped into the tank, as shown in the diagram.



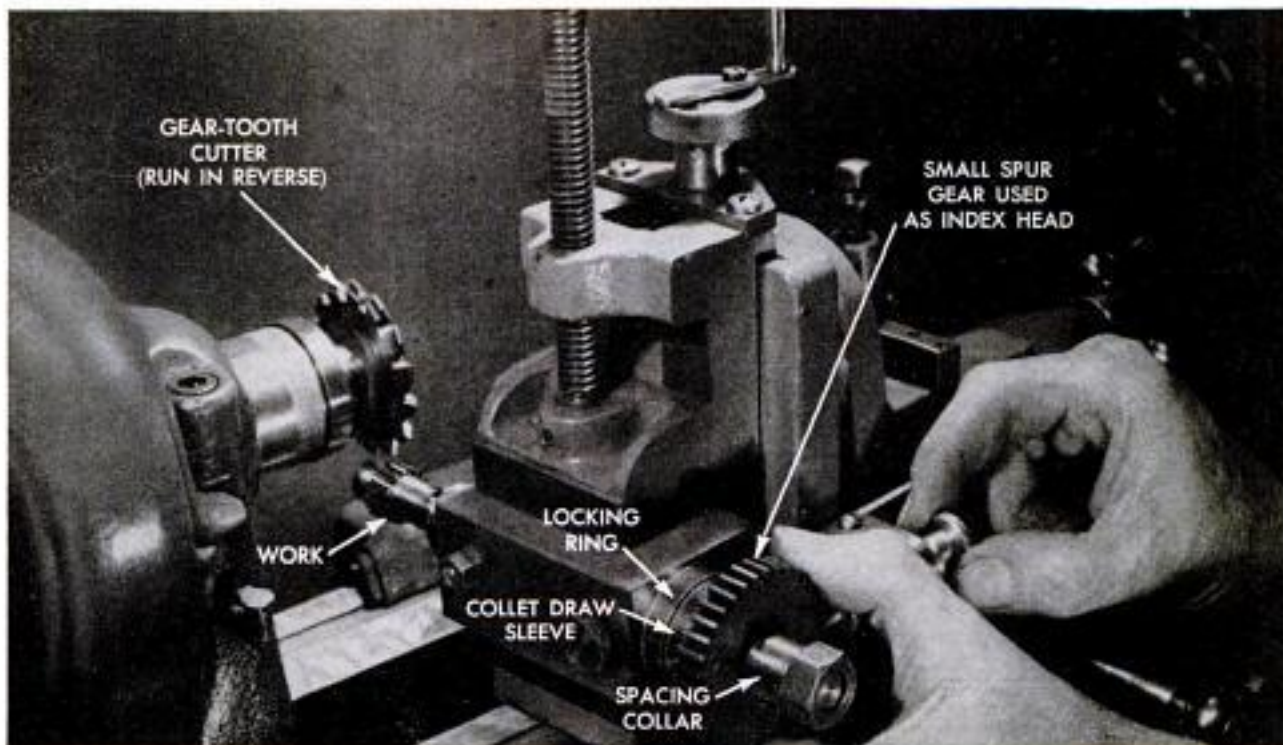
Some experimenting will be necessary to determine the amount of hot water required to provide the correct final temperature.—H. V. Buschmann, North Wilmington, Mass.

Electric Shaver Quickly Cleaned With Discarded Hairbrush

A discarded hairbrush, because of its firm bristles, makes an excellent cleaner for the shaving head of an electric shaver. A few light passes of the hairbrush over the shaving head will do a quicker and better job than the small brush usually supplied with a shaver, and the longer bristles permit a more thorough cleaning of the comb and cutter when disassembled.—Glen F. Stillwell, Manhattan Beach, Calif.



Shop Notes



Indexing attachment in typical setup for cutting teeth on small gear. Note that gear is used as index head

INDEXING ATTACHMENT for small lathes

By Walter E. Burton

SSMALL MACHINE SHOPS, modelmakers and others who use a lathe for a variety of machining operations, often encounter a job requiring use of an indexing head. This one is especially designed for use in the lathe milling attachment. As

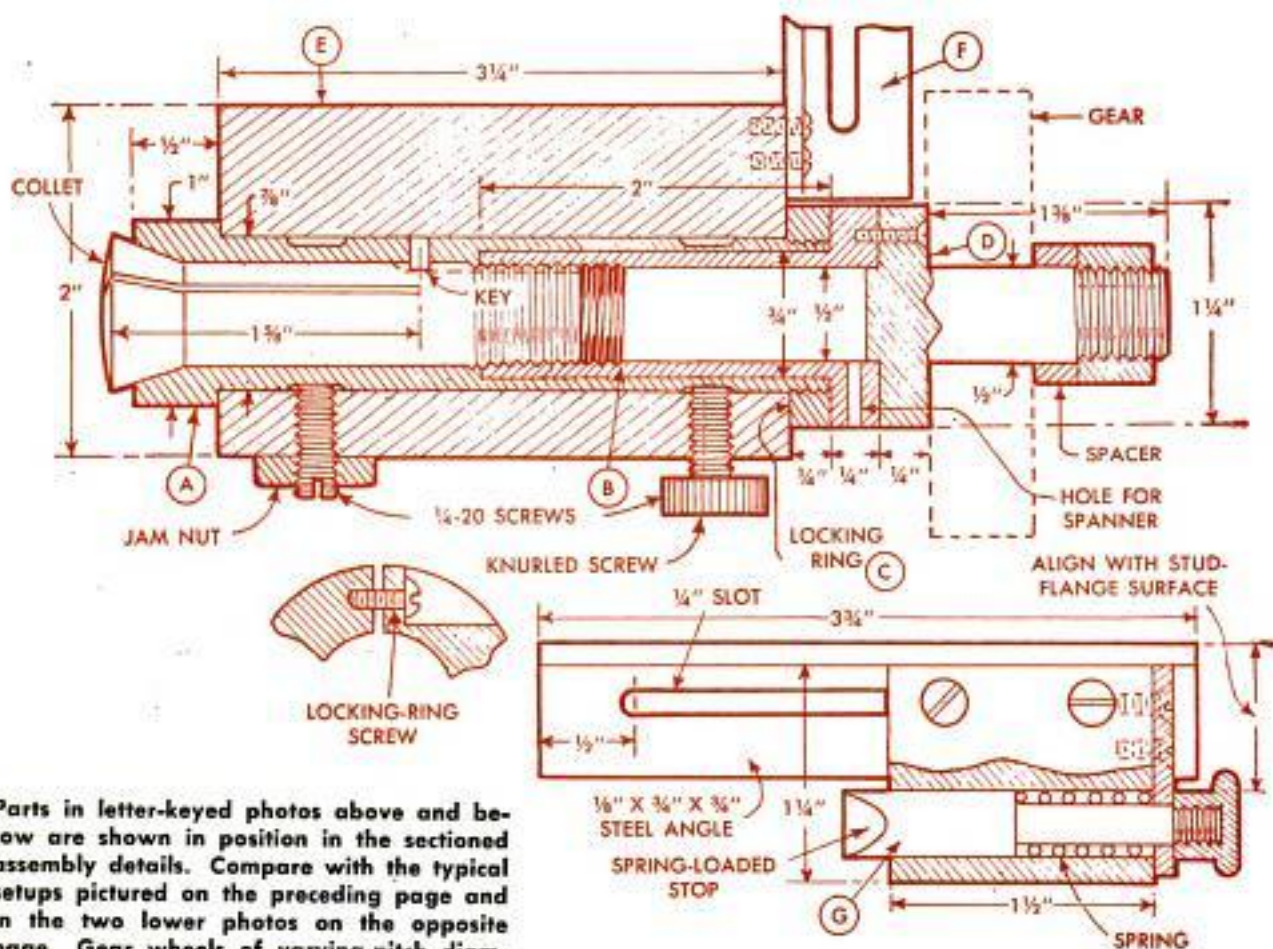
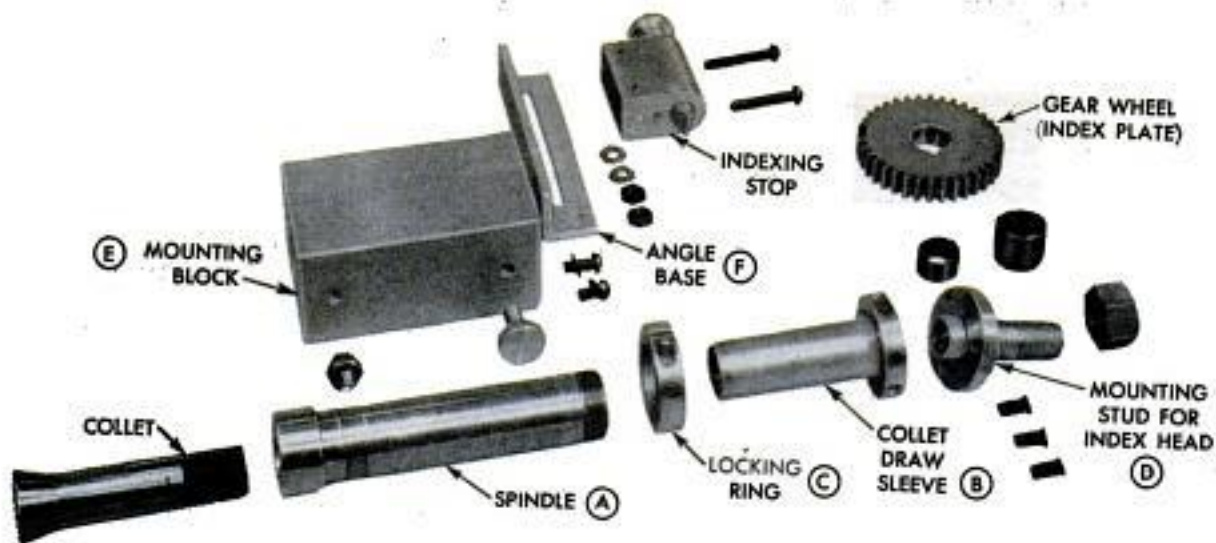
Outer diameter of the spindle can be finished by careful filing. File should be stroked uniformly

pictured in the photo above, it consists of a collet, collet draw sleeve and a mounting block to which an indexing stop is attached. For many jobs, a spur gear will serve as the indexing head.

The parts are shown in the keyed details,

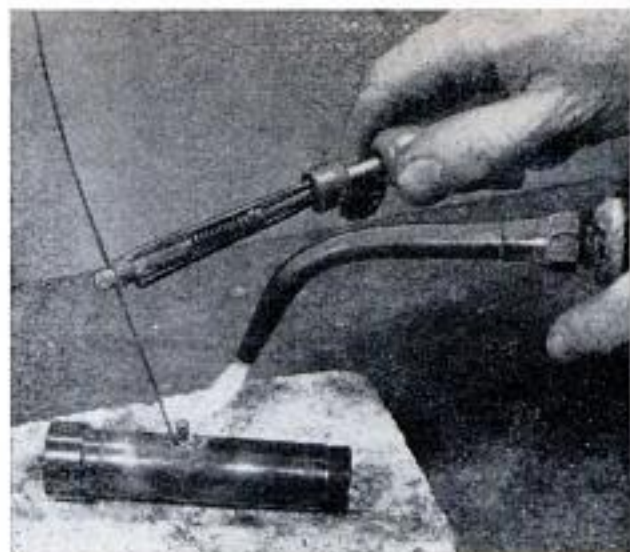
Small end of the spindle is threaded to take the locking ring which holds spindle in mounting block



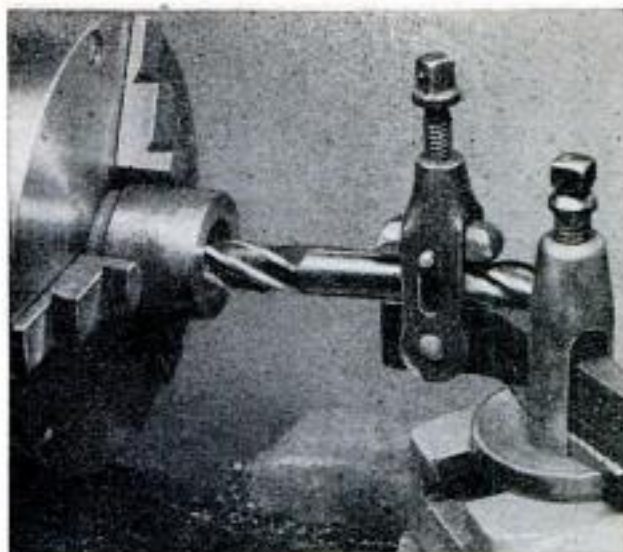


Parts in letter-keyed photos above and below are shown in position in the sectioned assembly details. Compare with the typical setups pictured on the preceding page and in the two lower photos on the opposite page. Gear wheels of varying-pitch diameter can be used for the most common indexing requirements. Standard collet is used





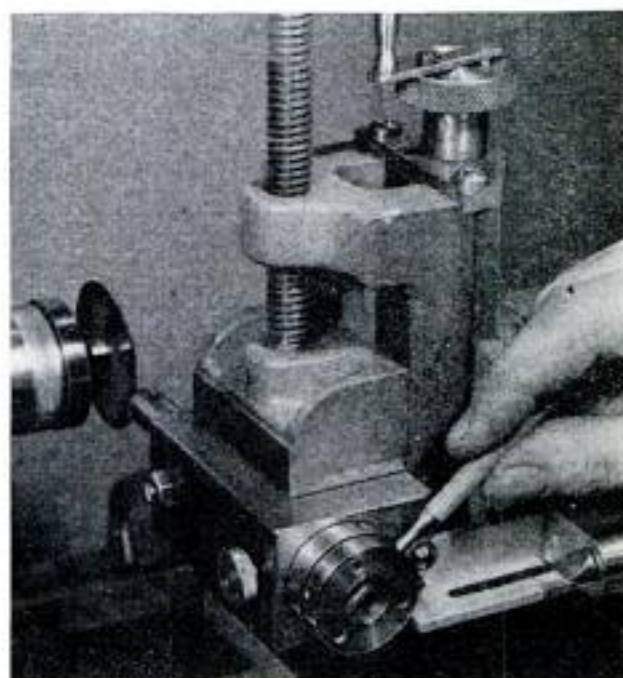
Silver-soldering key in the spindle which engages a groove in the collet to prevent it from turning



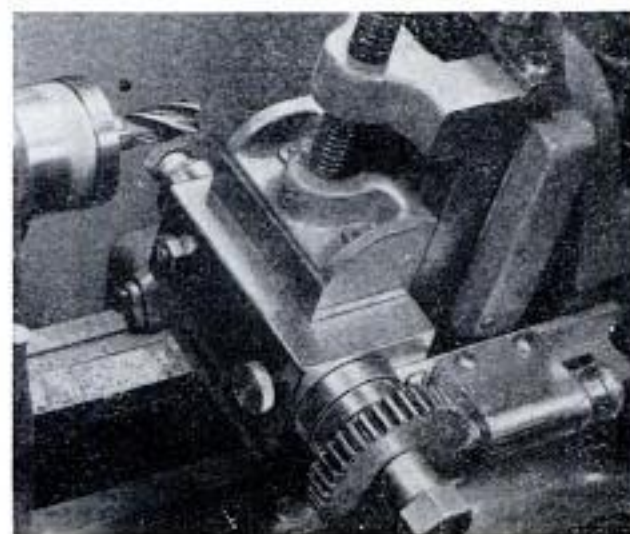
Cutting the taper in the spindle nose can be done with an ordinary milling cutter. Note the setup used

A to G, inclusive, also the photos on the opposite page. The simplest machining operations turn out a unit capable of doing very accurate work. The first step is turning the spindle, part A. Note that the outer end is shouldered down and the bore is tapered to form a closure for a standard collet. The bore also is counterbored to take the collet draw sleeve, part B. This passes through the locking ring, part C, its internal thread engaging the collet, as in the sectional view. The mounting stud, part D, is flanged and has a projection which fits snugly inside the outer end of the draw sleeve as in the sectional view. The outer end is threaded to take a standard $\frac{1}{2}$ -in. hex nut. Next, the mounting block, part E, is drilled and tapped as indicated. Note that in the assembly a key is silver-soldered in a hole drilled in the spindle to engage the slot in the standard collet to prevent it from turning in the spindle. The two photos below picture setups using gears of various sizes. ★ ★ ★

Setup for milling a hex head on the end of small rod. Milling vise permits movement in two directions



Collet is tightened on work by turning draw sleeve with spanner wrench or with a pin punch as pictured



Gear wheel used as indexing head is chalk-marked into the number of divisions required by the work

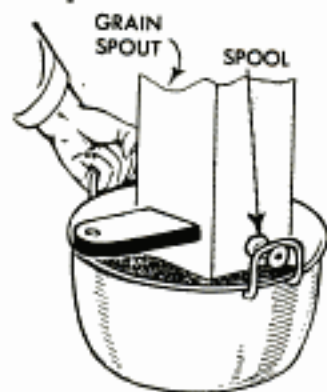


"Pressurized" Protective Hood Keeps Out Paint Spray

To prevent the paint mist from working in under his protective hood when spraying in close quarters, one painter "pressurized" his hood. A length of copper tubing is stitched to the cap of his helmet and one end is inserted in a hole cut in the visor. A filter cloth is tied to the end of the tubing to disperse the air inside the hood. A suitable length of small rubber hose is slipped over the free end of the copper tubing and connected to a valve on the air line. The valve need be opened only slightly to provide sufficient air pressure inside the hood.

William R. Palmer, Tuckahoe, N. Y.

Knob on Side of Grain Spout Helps Fill Feed Basket



Filling a feed basket from a grain spout can be simplified by providing a knob to hold one handle of the basket, thus freeing one hand to operate the slide. The knob is a spool screwed to the spout.

Disposable Tissues In Workshop Provide Safety Factor

Although not often thought of as a shop accessory, disposable cleansing tissues can be used for dozens of jobs around the workbench. Their absorbent qualities make them ideal for wiping up paint spots and, dipped in thinner, they can be used to remove paint

from hands and clothes. Used with gasoline or other solvent, the tissues quickly remove grease from tools. Because they are disposable, the tissues eliminate the chances of spontaneous combustion presented by oily rags or waste.

Frank A. Bartonek, Kansas City, Mo.

Identifying Letters on Milk Can "Painted" With Soldering Iron

To overcome the problem of having to frequently repaint the identifying initials on milk cans, "paint" the letters with solder, which will last almost as long as the can itself. First, clean the spot on the can with emery cloth, then apply flux and tin the metal. Scratch an outline of the desired letters and apply several layers of solder with a torch or iron to build them up.

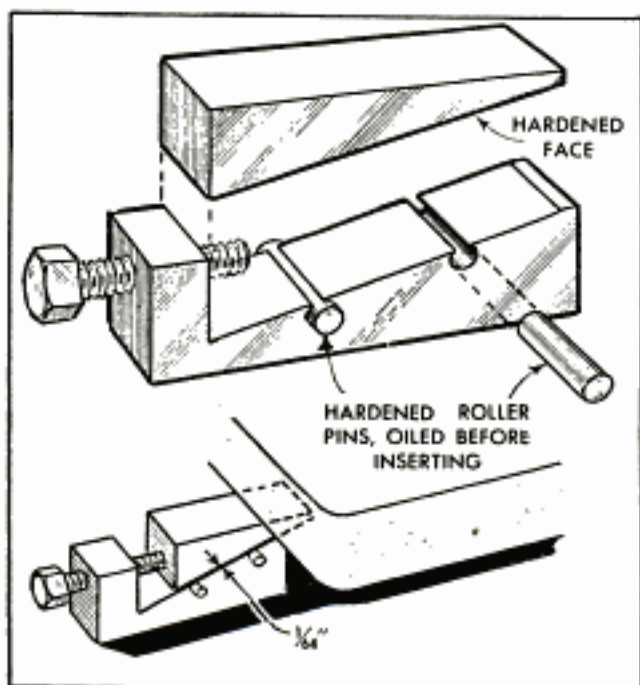


G. E. Hendrickson, Argyle, Wis.

Sliding Wedge Used as Jack To Level Heavy Machinery

Confronted with a job where regular leveling jacks and wedges could not be employed, one maintenance man used the screw-action sliding wedge shown in the detail. Faces of both contacting surfaces are hardened, as are the roller pins which lie in half-open holes in the wedge. The rollers project only $\frac{1}{64}$ in. above the surface.

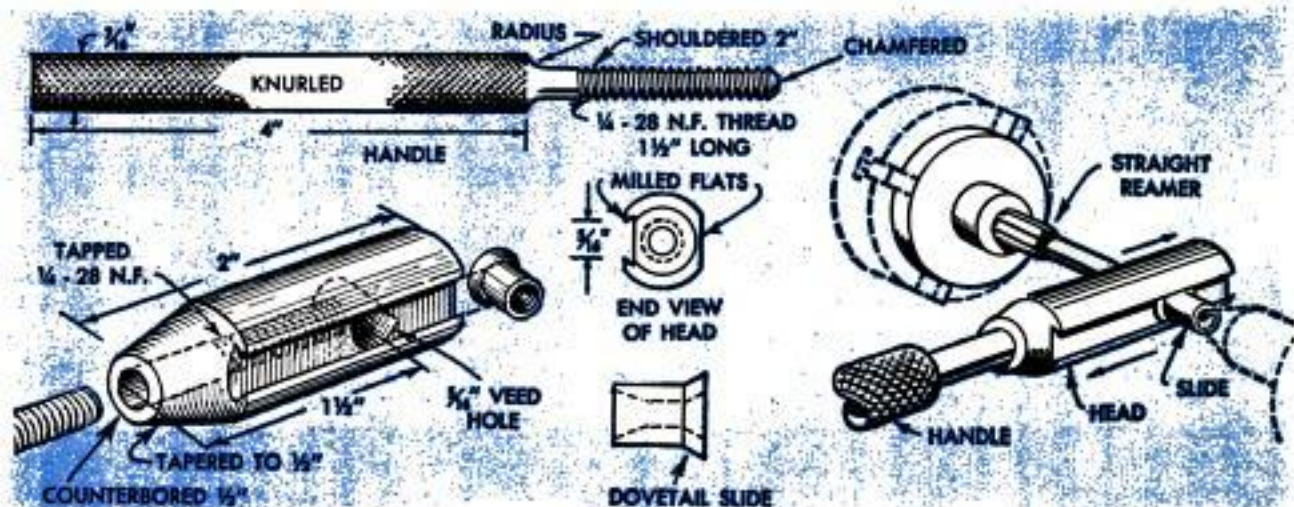
Charles H. Willey, Penacook, N. H.



"Floating" Lathe Holder for Drilling or Reaming



This holder "floats" the reamer or drill into precise alignment when drilling or reaming from the tailstock. It consists of a head which is a 2-in. length of $\frac{3}{4}$ -in.-dia. steel round one end being drilled $1\frac{5}{8}$ in. deep and tapped $\frac{1}{4}$ -28 to receive the threaded end of the handle. The hole is counterbored $\frac{1}{2}$ in. deep with a $\frac{1}{4}$ -in. drill, and the end of the head is tapered to $\frac{1}{2}$ in. Flats $\frac{3}{8}$ in. wide are milled on opposite sides of the head and $\frac{3}{16}$ -in. dovetail slot is milled along one flat, as in the end view. A $\frac{5}{16}$ -in. hole is drilled through from the opposite flat and the hole is filed to a V-shape, as indicated. The dovetail slide fits snugly into the milled dovetail and is center-drilled to take the 60 deg. lathe center. In use, a drill or reamer is fitted into the V-shape hole and the handle is screwed in to lock it in place. The setup is made as in the lower right-hand detail.



Constant Water Supply for Poultry Provided by Cistern and Pump

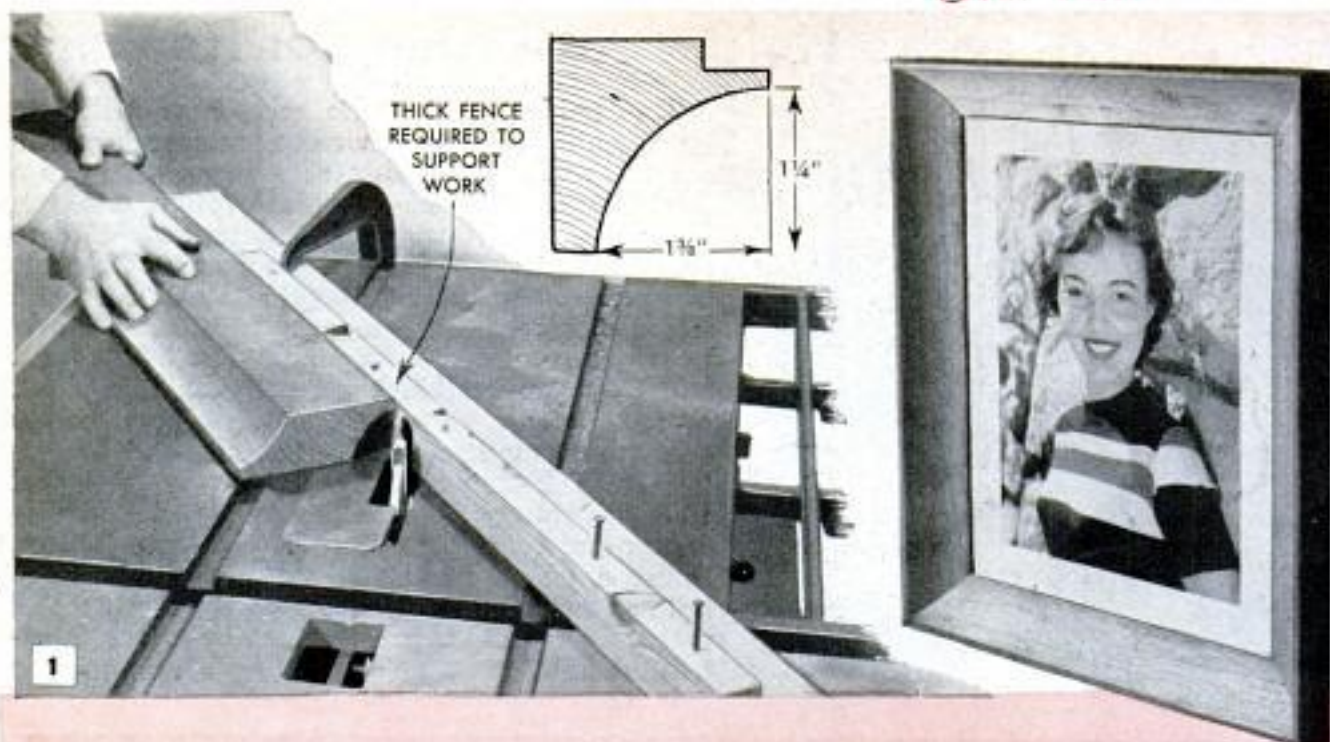
One poultryman assured himself a constant supply of water for his flock by building a cistern under the floor of the poultry house. All downspouts from the gutters on the building lead to the cistern. The latter is capped with a tight-fitting concrete slab and a well pump is provided for lifting water with a minimum of effort. The watering trough pictured was made from halves of a hot-water tank cut lengthwise and mounted on a wooden stand. Perches were provided on each side. In this case, the troughs were placed near the pump.



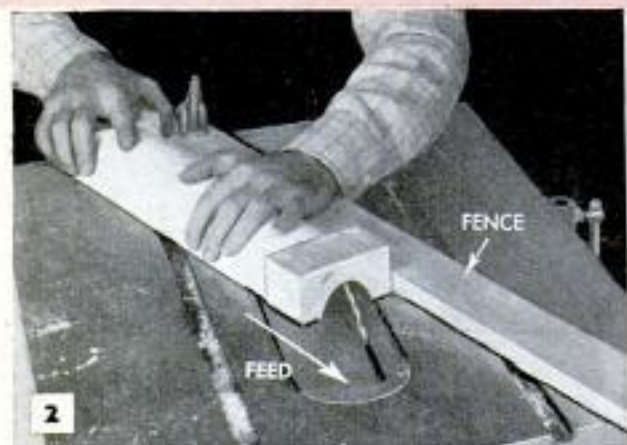
Removal of Broken Handle

If you find it impossible to remove the remains of a broken pitchfork handle from the ferrule, push the fork into the ground and apply a blowtorch flame to the wood. This will char the wood so that it can be broken up and removed with a chisel.

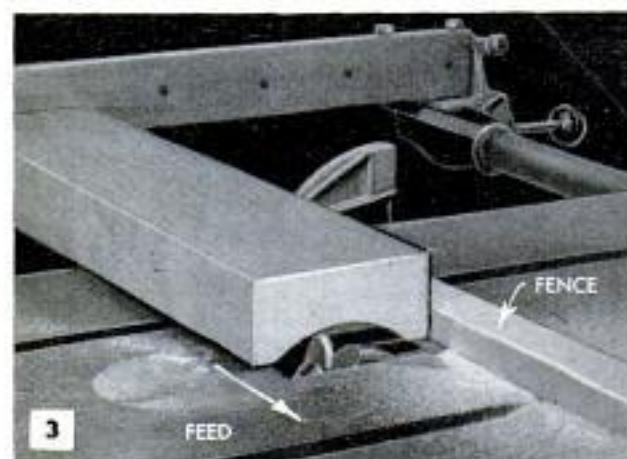
SN 56



COVE CUTTING ON



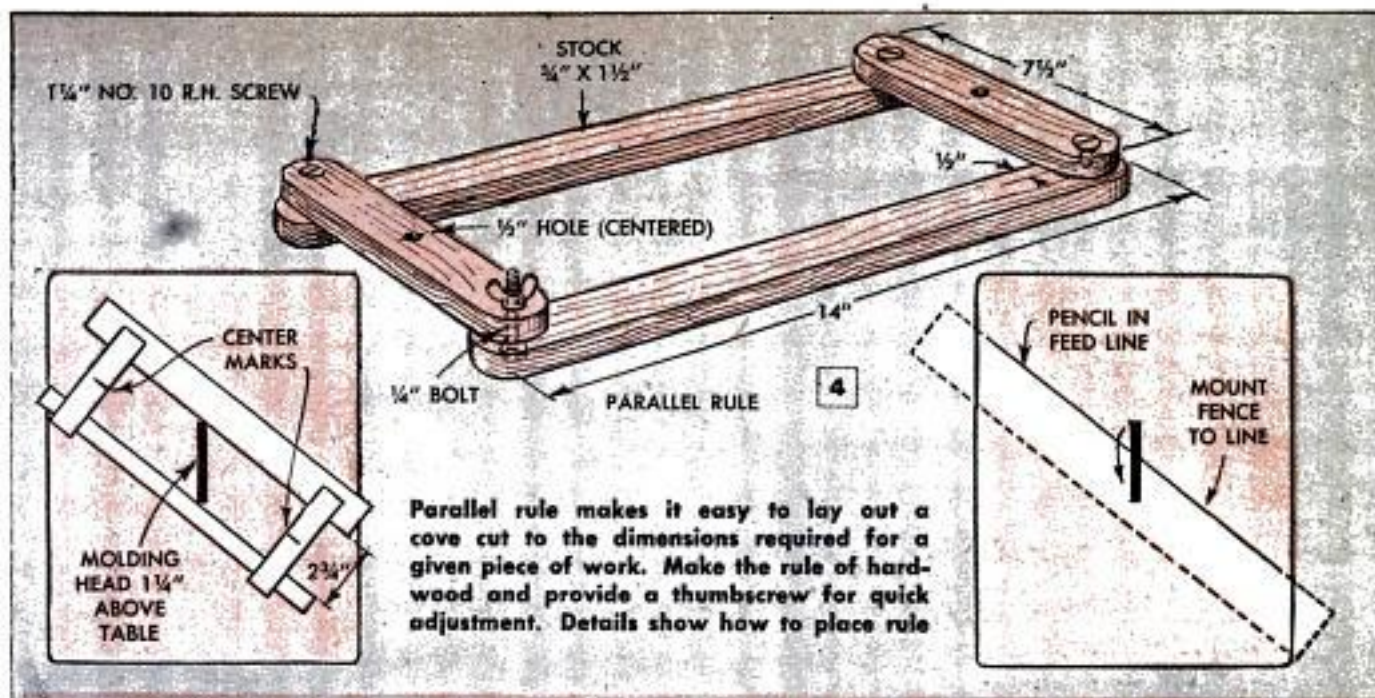
It is practical to use a saw blade for cove cuts up to about 45 deg., as above. The cuts are about $\frac{1}{8}$ in. deep per pass. Below, the molding head is a true cutter and will cut any angle up to 90 deg. With it, cuts can be as deep as $\frac{1}{2}$ in. per pass. The molding head performs better, but the saw can be very useful



ONE OF THE most novel techniques in circular-saw operation is the oblique feed used for cutting large coves. The actual cutting tool can be either a regular saw blade or a molding head. If a saw blade is used, it should have a medium-wide set, since it is the set of the teeth which enable it to cut when the work is fed at an angle. The molding head is a better performer, being a true cutting tool, and capable of biting off a $\frac{1}{2}$ -in. cut per pass, whereas the depth of cut per pass with a saw is only about $\frac{1}{8}$ in. However, the saw blade can be useful in cutting very large shapes.

Every cut made with oblique feed is part of a true ellipse. The diagram in Fig. 12 shows the range of cuts possible with a 6-in. molding head. The molding head will cut work at any angle up to a direct 90-deg. cross-feed, Fig. 3. The saw blade is practical to about a 45-deg. angle, Fig. 2. Cuts can be made with the cutter or table tilted, as shown in Figs. 10 and 11, to produce large scotia moldings.

The first step in using an oblique feed is to make a setting-out frame, left-hand detail, Fig. 4, with an inside span equal to the width of the desired ellipse. The example in Fig. 1 is a half-ellipse, making the full shape $2\frac{3}{4}$ in. wide, which is the width of the frame, as shown in the detail in Fig. 4. Put the frame over the cutter and then twist the frame until the cutter just nicks both of the inside edges, as shown. The



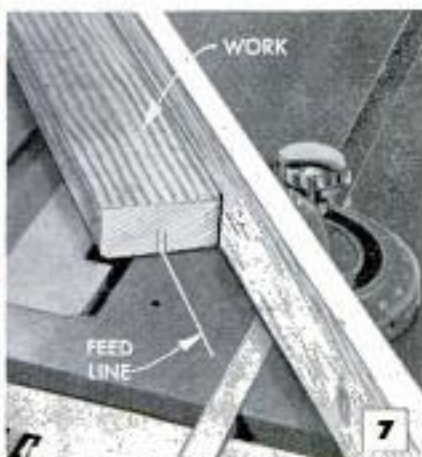
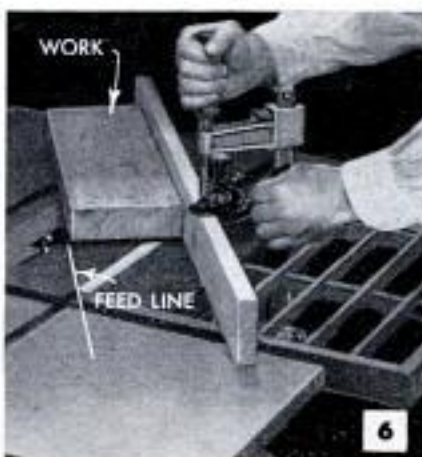
THE CIRCULAR SAW

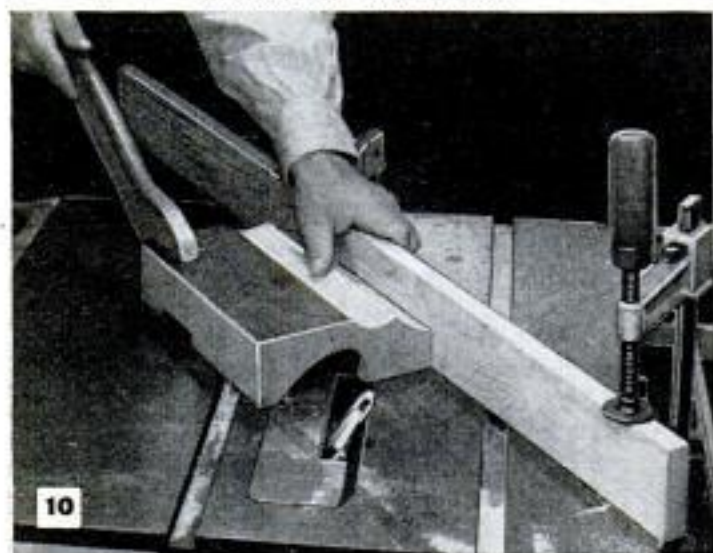
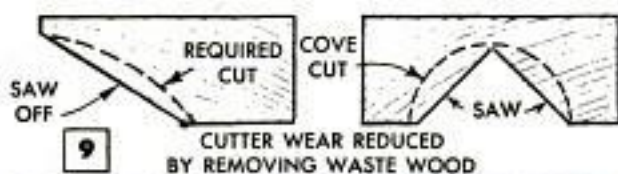
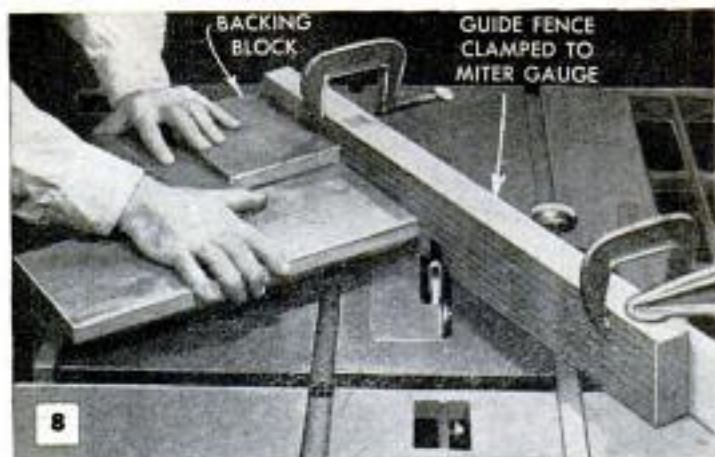
projection of the cutter when doing this should be equal to the required depth of cove which, in Fig. 1, is 1 1/4 in. With the frame in position, it is a simple matter to make pencil marks to locate the feed line, shown in the detail, which is marked on the saw table. If you do much cove cutting, the parallel rule, Fig. 4, is useful as it can be set to any desired width. The 1/2-in. holes in the crossbars are always centered and will locate the feed line so that it is centered with the molding head.

The rest of the job is simply a matter of clamping a guide fence alongside the feed line and making the cut. Note that the fence must be held high enough to support the uncut portion of the work. Three or four passes will cut the full shape, with

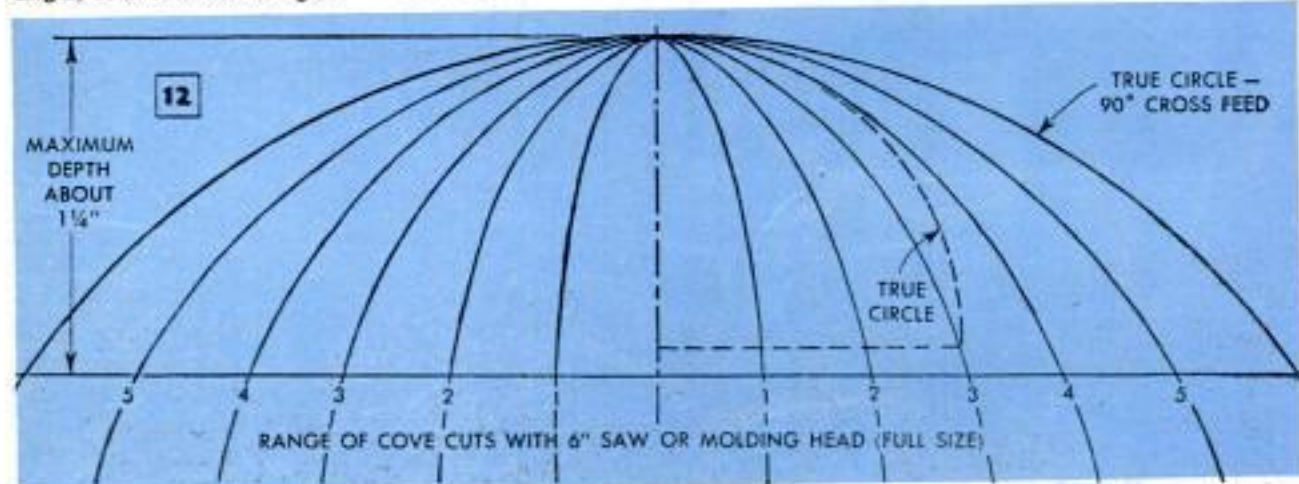
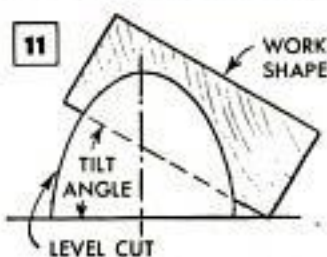
the final cut being a light one for a smooth finish. Molding-head work requires no sanding. If desired, the cut can be made on the far side of the work, as is being done in Fig. 5. This is often advantageous, since it permits a low fence. When the feed line makes an angle greater than 30 deg. with the saw blade, the miter gauge fitted with a wood facing can be used as a guide fence, as in Fig. 6. This is the handiest setup and should be used when possible.

A half circle cut is set by placing the center line over the feed line, as in Fig. 7. When a cove cut is required on narrow end grain, the work should be supported with a backing block, as shown in Fig. 8, to assure a safe, smooth feed. Also, in common with the same operation done on other





Cuts can be made with either the cutter or the table tilted. For angle cuts, sketch shape from diagram below on tracing paper and then draw the work shape over it at a suitable angle. The angle as drawn is the tilt angle, as shown to the right

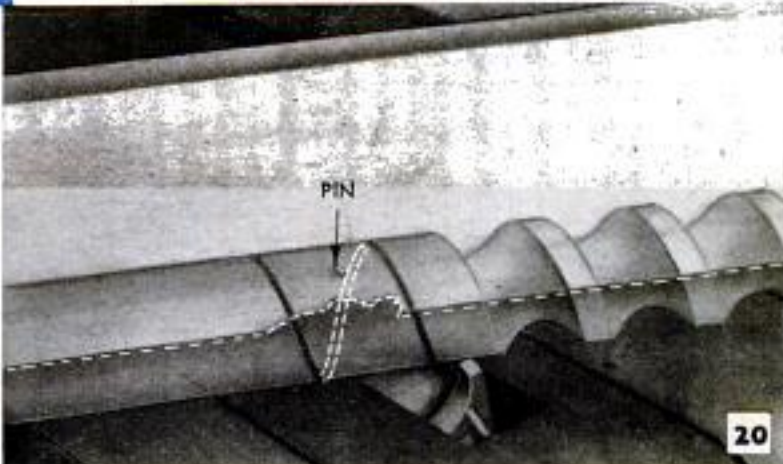
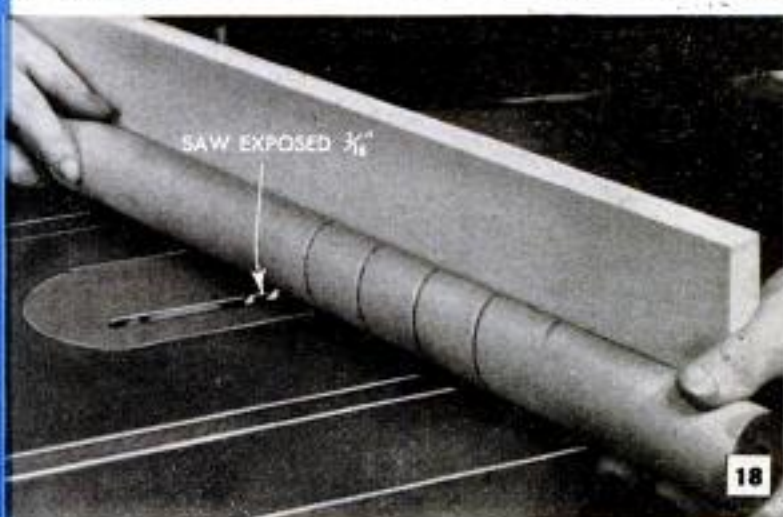
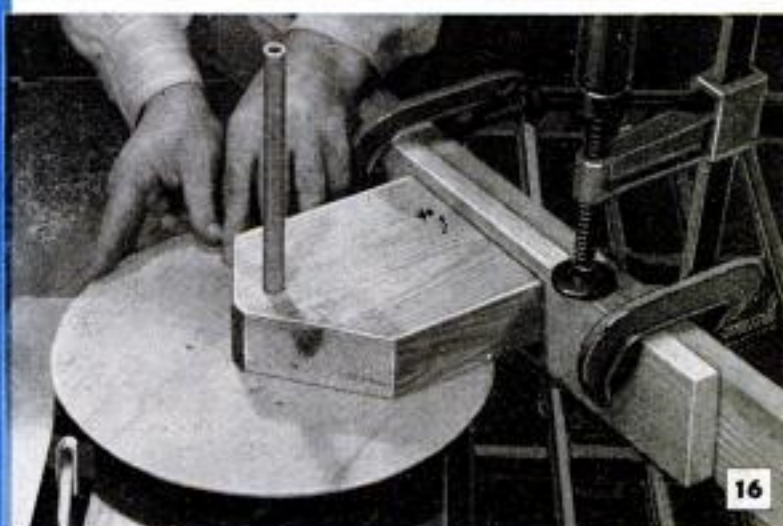
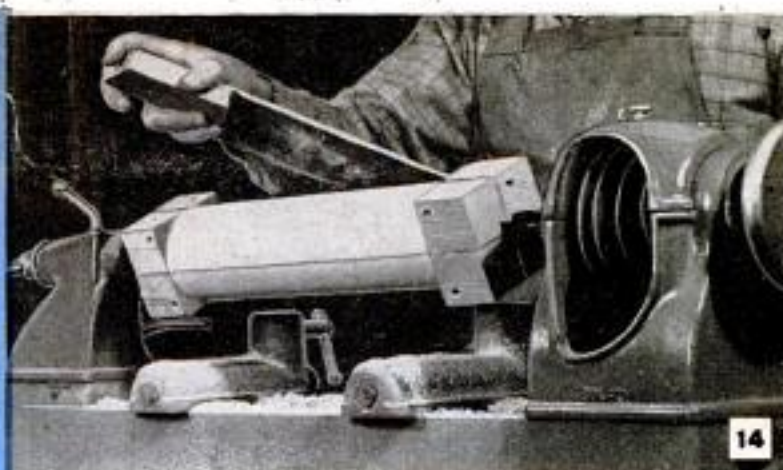
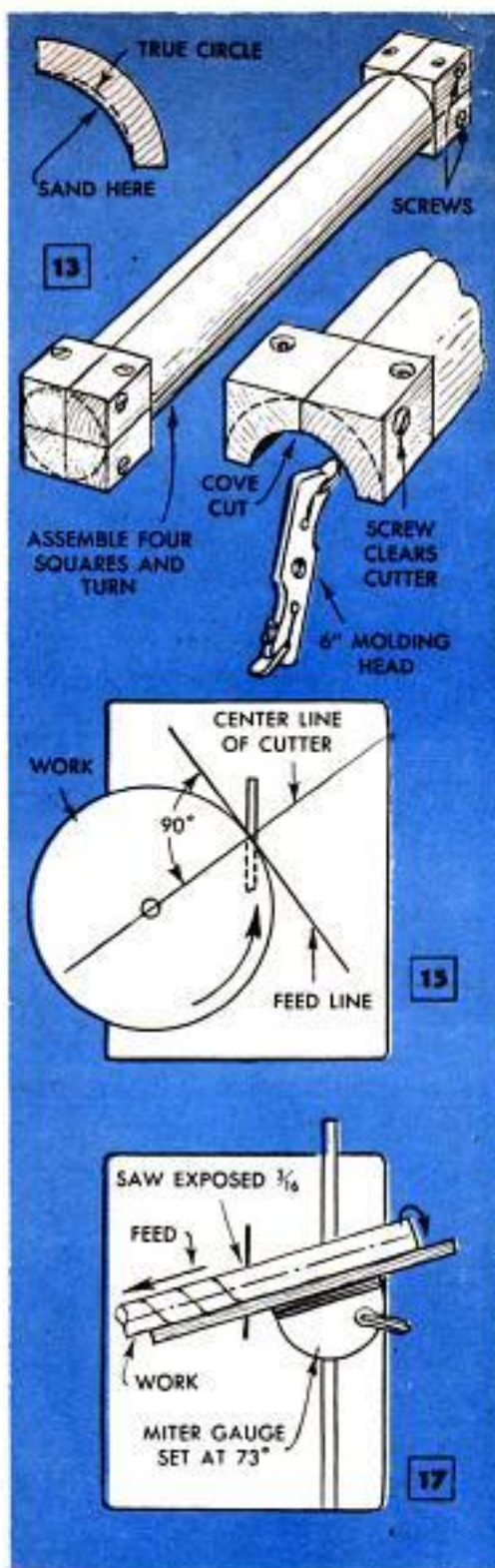


tools, the end-grain cuts should be made first so that slight grain tearing at the end of a cut will be cleaned by succeeding with-the-grain cuts. Smoother work with less cutter wear is possible if some of the surplus wood is sawed away, as illustrated in Fig. 9.

An angle cut, Fig. 11, is just as easy to make as a level cut. To determine a suitable shape, sketch on tracing paper any ellipse from the diagram in Fig. 12, and then draw the work shape over it at a suitable angle. The angle as drawn is the tilt angle. Setting-out is done in the same manner as for a level cut.

One of the most important uses of the cove cut is in making the inside round for round corner blocks. The external shape is worked by turning a four-square assembly in the lathe, Figs. 13 and 14, after which the inside cut is made by using oblique feed. If you want to cut a cove on circular work, determine the feed line as for a straight piece of work, and then locate a pivot point by drawing a line at right angles to the feed line, as shown in Fig. 15. The pivot arrangement itself can be any of several setups, the example in Fig. 16 being a wood block nailed to a wooden strip which is clamped to the wood facing of the miter gauge.

A unique job done with the oblique feed is the spiral cove. This is done by first sawing a spiral on the work, as in Figs. 17 and 18, letting the work rotate as it is pushed lightly along the guide fence. For this work, the saw blade is exposed $\frac{3}{16}$ in., with the miter gauge set at 73 deg. Then, with the miter gauge swung to the opposite side of center, the saw cut engages a guide pin to make the cove cut, Figs. 19 and 20. In the phantom view, Fig. 20, note the location of the pin in relation to the saw blade. ★ ★ ★

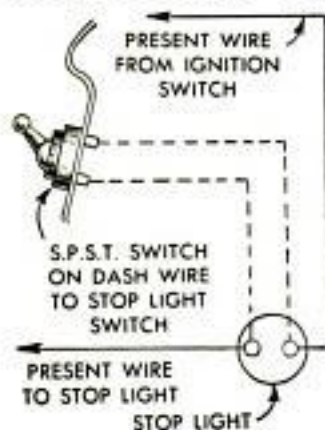




Intercom Between House and Barn

Because he spends at least 60 percent of his working time in the barn which is 200 ft. from the house, one dairy farmer has installed a two-way intercommunication system between the two buildings. Telephone calls and other information received at the house are immediately relayed to the barn via the system and are as quickly answered. The units of the system are battery-powered and connected by a two-wire cable.

Stop-Light Switch on Car Dash Provides Rear "Fog Light"



An extra-bright taillight, which will furnish a safety precaution when driving in heavy fog, can be provided by a switch that allows continuous burning of the stop-light bulb. A single-pole toggle switch is mounted on the dashboard and wired in parallel with the stop-light switch. When the switch is turned to the "on" position it will shunt out the regular stop-light switch and permit the one stop light to burn continuously. This idea is especially useful on older cars that have small, dim taillights. Note

that this idea should be used only on cars having two taillights. One stop light is wired to burn continuously while the other flashes on application of the brake.

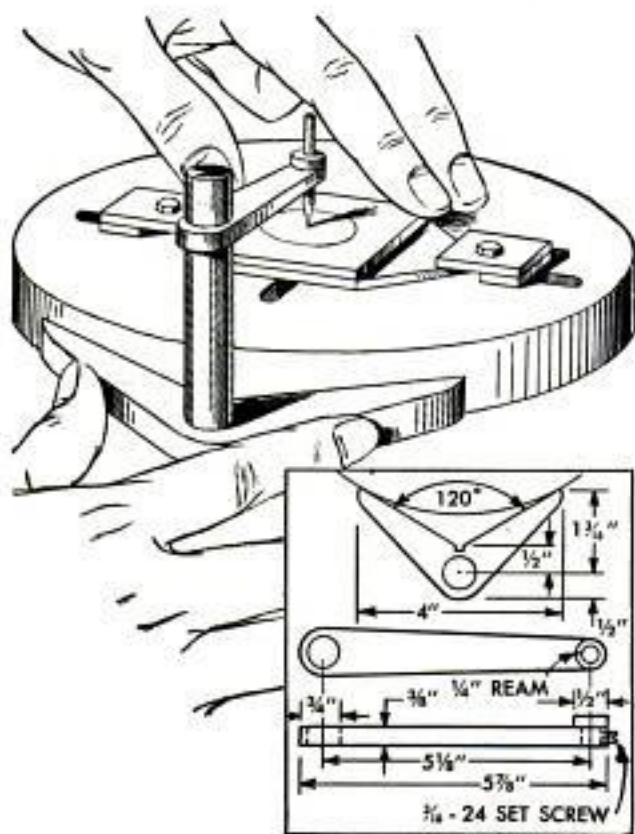
Fred Lettino, Astoria, N. Y.

Ground Rod Reinforced by Pipe

To prevent a long electric ground rod from wavering and bending when driving it into hard or stony ground, first force a short pipe into the ground and insert the rod. When the rod has been driven in several feet, the pipe is removed and the job finished without further difficulty.

Faceplate-Center Indicator Speeds Job Setup

A faceplate-center indicator will aid in centering irregular-shaped work in the lathe when the center hole of the faceplate is hidden. The indicator is made according to the dimensions given in the detail, with the exception that the length of the support arm will vary according to the diameter of the faceplate being used. The pointer is shaped and ground from a length of drill rod while the rest of the indicator is cut from cold-rolled steel. To use the indicator, remove the faceplate from the lathe and place it flat on the bench. Hold the indicator against the edge of the faceplate, center the work and clamp it tightly. When the faceplate is remounted on the lathe, the work will require only a slight tap or two to run dead true.—C. W. Woodson, Chicago.



SN 56

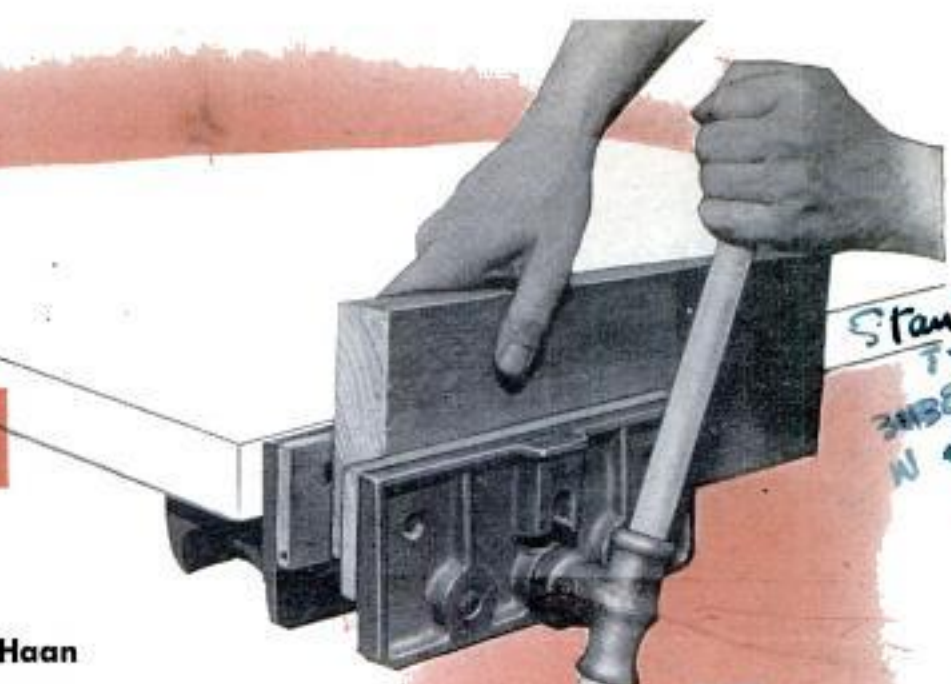
selecting and using a

BENCH VISE

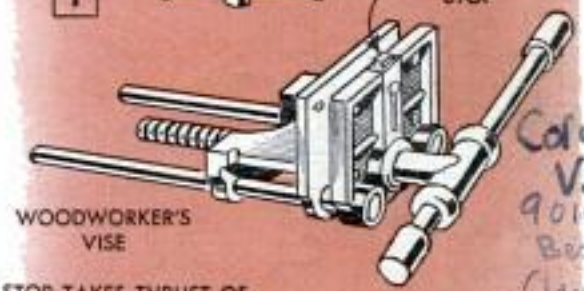
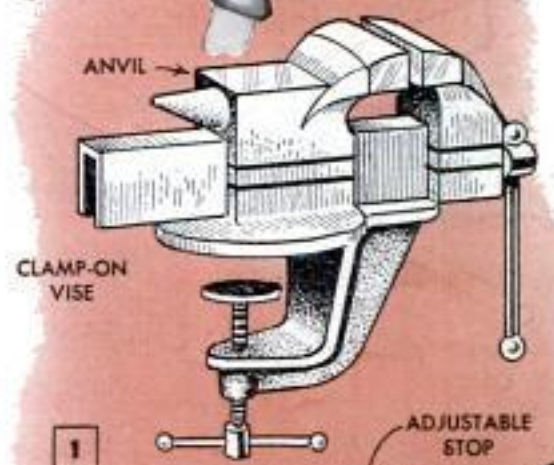
By E. R. Haan

WHEN SHAPING PARTS of wood or metal with ordinary hand tools it is impractical if not impossible to work without a bench vise. There are many types of vises, varying in size and application, but all are dual-purpose clamping and holding tools. Two of the most common, especially in the home workshop, are the clamp-on vise and the rapid-acting woodworking vise, both shown in Fig. 1. The first clamps to any table or bench top and comes in jaw sizes ranging from 1½ to 3 in. It is suitable for light work. The rapid-acting vise has full-depth jaws and a splined screw which permits the movable jaw to be drawn out to the full opening without turning the handle. The screw is engaged or released at any point within the full opening simply by turning the handle left or right. The full-depth jaws adapt this vise to clamping wood without denting or marring. It is also available in single-acting type having a continuous screw. Figs. 2 and 3 show several applications of the rapid-acting vise on a bench. Fig. 4 shows an underneath view of this vise and the manner of attaching it to the bench. Fig. 5 details a support which comes in handy for supporting long boards held in the bench vise for jointing. One end of the board rests on the pin, which can be inserted in holes drilled in the bench leg at different heights.

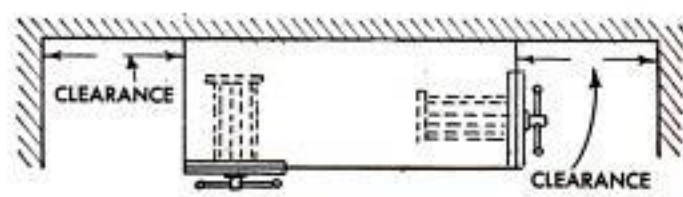
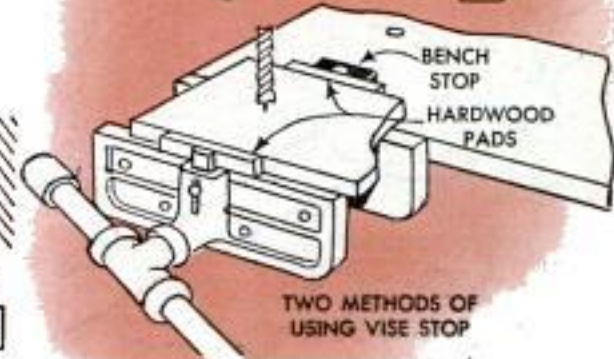
The right-angle vise, or clamp, shown in Fig. 6 is made especially for clamping the



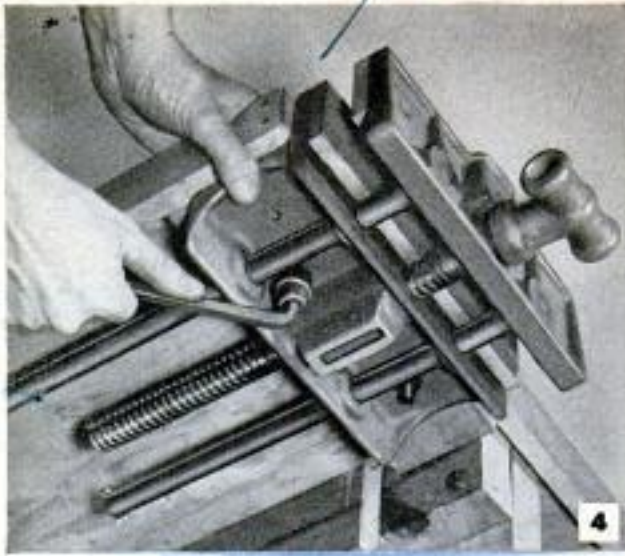
Stanley
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WOODWORKER'S VISES ARRANGED AT ENDS OF BENCH 3

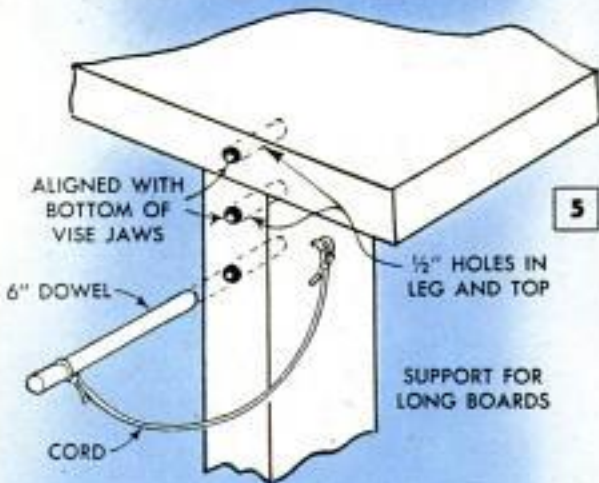


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mitered corners of picture frames but is adapted to other operations requiring the clamping of mitered stock. The jaws open to approximately 3 in. and the unit tilts from the horizontal to the vertical position.

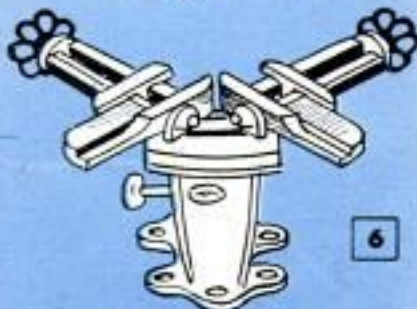
Fig. 7 pictures one general type of the machinist's vise, an indispensable bench tool in machine shops, tool rooms and experimental laboratories. Machinists' vises have swivel bases which permit the unit to be swung to any position convenient to the user when working from the front or end of the bench. Nearly all sizes are fitted with removable jaw inserts. Frames and jaws are exceptionally heavy and are designed to withstand extreme pressures. Nearly all sizes have a small built-in anvil or flat hardened surface for light hammering necessary when shaping or assembling small parts.

The drill-press vise is something special as you will see from Fig. 8. The sides of the frame are milled parallel and at right angles to the bottom. Both fixed and movable jaws are finished on the sides and faces. It is furnished as a plain unit with a separate V-block insert, also on a swivel base as pictured and in a universal type which provides both a swiveling and angular adjustment. The bases are slotted and finished smooth on the bottom for bolting to the drill-press table. Another type, quite commonly used in pairs, consists of a long bar on which are mounted fixed and movable jaws capable of a wide range of adjustment. It is especially useful on the drill-press table for holding wide, flat work for drilling at various points on the surface. When used either singly or in pairs the unit is easily attached to the drill-press table.



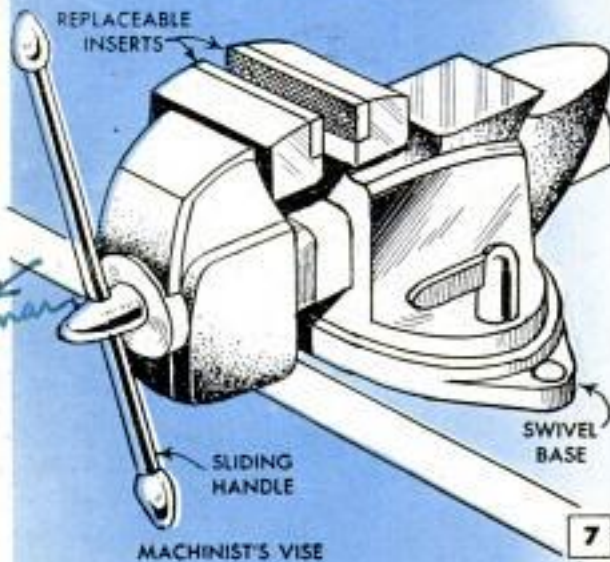
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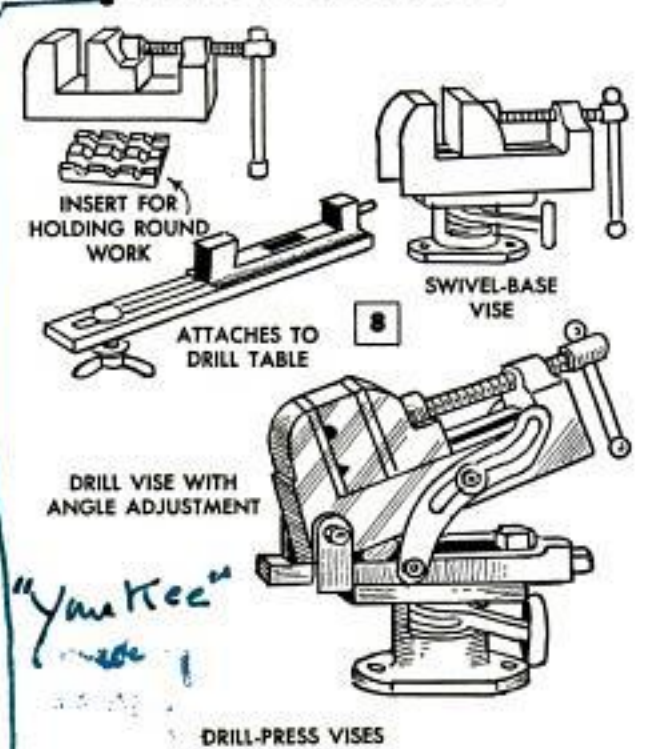
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MITER VISE (FOR PICTURE FRAMING)



7

MACHINIST'S VISE



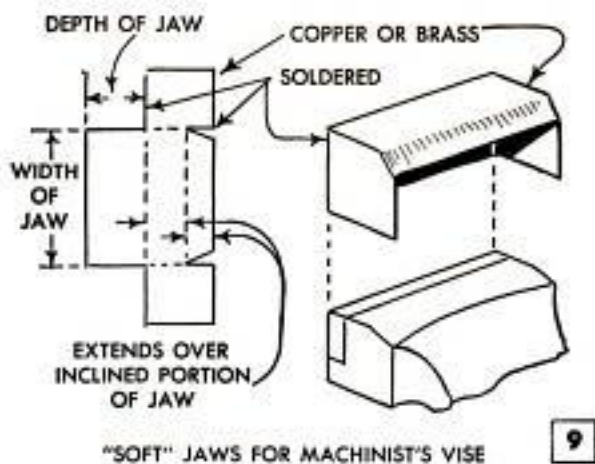
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SWIVEL-BASE VISE

DRILL VISE WITH ANGLE ADJUSTMENT

"Yankee"
made

DRILL-PRESS VISES

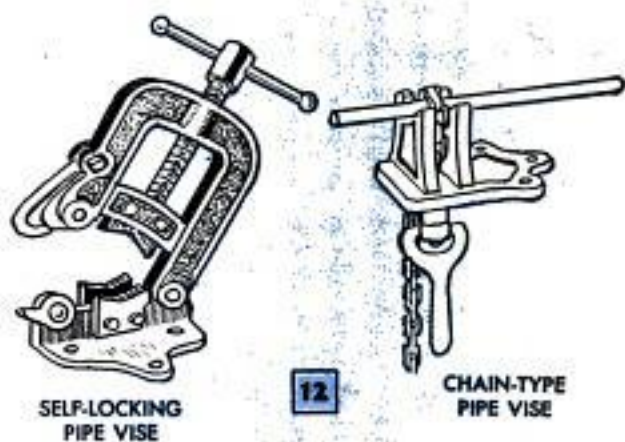
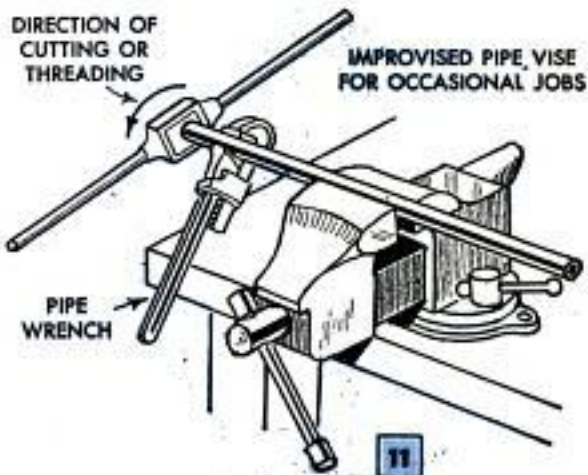
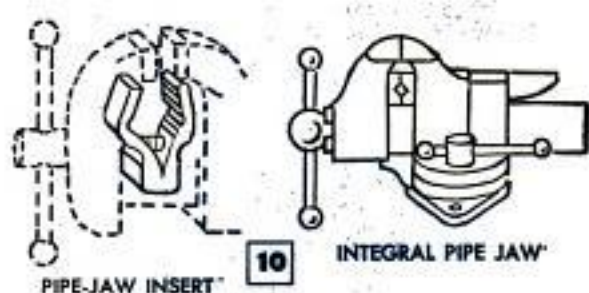


"SOFT" JAWS FOR MACHINIST'S VISE

When holding finished work in the vise for some final operation, machinists and diemakers often provide "soft" jaw faces to prevent defacing the work. These usually are made as in Fig. 9 from softer metals such as copper, brass or aluminum. They should fit the jaws snugly so that they will stay in place while in use, yet should be easily removable when not required.

Pipe jaws of both the removable and integral types are furnished with several types of bench vises, Fig. 10. These are especially useful in the home shop where limited use will not justify the purchase of the standard pipe vise. However, if your present vise does not have pipe jaws you can still make use of it as in Fig. 11. The setup is simple, utilizing a pipe wrench as the pipe jaws, the vise merely serving to hold the pipe in position. Two types of standard pipe vises are shown in Fig. 12, one the chain type familiar to all plumbers and the other the self-locking vise which is available in a variety of sizes.

One thing to remember when bending metal in any type of vise: Always make the bend against the stationary jaw as in Fig. 13, never against the movable jaw as you may damage the screw, especially if hammer blows are necessary in making the bend against the stationary jaw, never against the movable jaw as you may damage the screw, especially if hammer blows are necessary in making the bend. When you cut angle stock, such as angle steel, aluminum and brass in various sizes, lock it in the vise jaws as in Fig. 13 with the web of the angle over the stationary jaw as pictured. The point of cut should be as close as possible to the end of the jaw so that there is adequate support, as pressure of sawing is against the stationary jaw. In this position the saw can be started on the flat side of the web instead of the edge, making it easier to start the blade straight and at the same time avoiding any chance of breakage. Vise pictured is the machinist's type having a swiveling base. ★ ★ ★

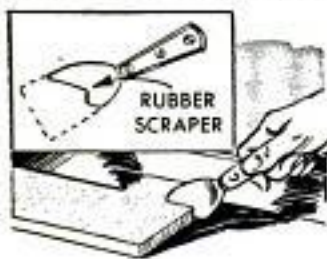


Automatic Cutoff on Water Pump Prevents Overfilling Tank



To permit a stock-watering tank to be filled to the desired level without attention, one farmer rigged an automatic shutoff for the gasoline engine that drove the pump. An insulated ground wire runs from the spark plug of the engine to an insulator fastened to the inside of the tank at the required depth. When the water rises in the tank and contacts the bare end of the wire, it shorts out the spark plug and the engine stops.

Push Stick for Bench Saw



To avoid the problem of having a push stick used on a bench saw split or slip on the work, make one from a rubber plate scraper or mixing paddle. Cut

away the rubber blade as indicated in the detail. Be sure the handle is securely fastened to the blade with rivets or screws; the handles of some mixing paddles are merely forced into the blade and will pull out easily.

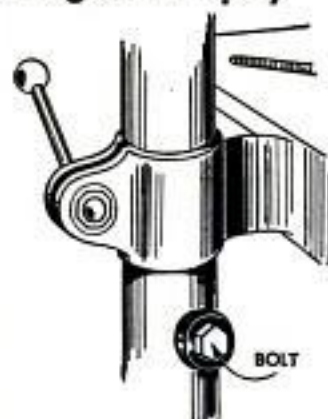
Replacing Broken Car-Hinge Pin

When a car door is out of line or has become loosened, a worn or broken hinge pin sometimes is indicated. One way of replacing the pin is to use the stem of an old engine valve. Just cut or grind off the head and then grind down the opposite end to a

shape similar to the common nailhead.—John H. Jacobsmeier, Jr., Holloman Air Force Base, N. Mex.

"Bumper" on Drill-Press Column Protects Operator Against Injury

A thick rubber washer bolted to the column of a drill press will prevent a possible broken toe or smashed foot caused by the drill-press table being dropped when the lockbolt is loosened. At a point a few inches above the floor,

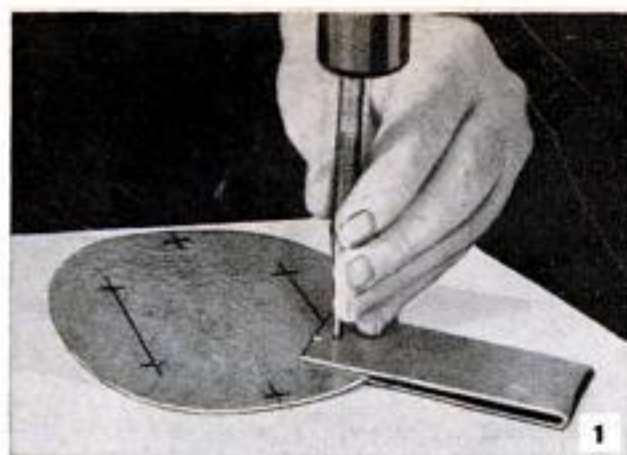


drill and tap a hole for a stud bolt to hold the washer in place. If the thickness of the wall of a hollow column does not permit threading, run the hole all the way through the column and use a bolt long enough to extend through the column. A rubber washer then is fitted under both the nut and the head of the bolt.—N. C. Dickey, Johannesburg, South Africa.

Concrete Apron of Machine Shed Used as Outdoor Workshop

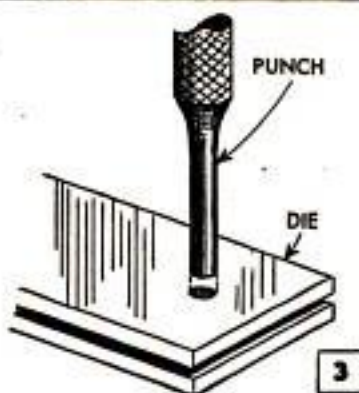
A level concrete apron, the width of the machine shed, combines the advantages of providing an all-weather entry to the shed with an outdoor shop floor. Large machinery can be towed onto the concrete for emergency repairs, thus eliminating the necessity of dismantling the machinery and wheeling it into the shed. This leaves more room in the workshop for servicing operations and maintenance work.





RIVET IT RIGHT

By Sam Brown



RIVETING IS ONE of the simplest and most practical methods of joining sheet metal and lightweight flat stock. In addition to forming a strong joint, riveting also provides a decorative feature which frequently adds to the appearance of the project.

Rivets: The size of rivet normally used in craftwork ranges from $\frac{1}{32}$ to $\frac{1}{8}$ in. in diameter and $\frac{1}{8}$ to $\frac{1}{2}$ in. in length. The single, most useful rivet for sheet-metal work is a roundheaded rivet, Fig. 6, which is $\frac{3}{32}$ in. long and $\frac{1}{4}$ in. in diameter. Also

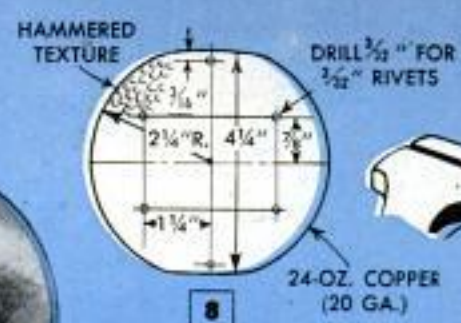
handy to have around are $\frac{1}{16}$ and $\frac{1}{8}$ -in.-dia. rivets, the smaller ones being $\frac{1}{8}$ in. long. Rivet mixes, which probably are available from your local hardware dealer, include a wide variety of head shapes and solid, hollow, one-end hollow and split shanks.

Riveting: A flat-formed head, shown in Fig. 5, is the most common type of formed head, or upset. This is done with any hammer having a flat face and always with light hammer taps to get a true peening action without deforming the shank of the

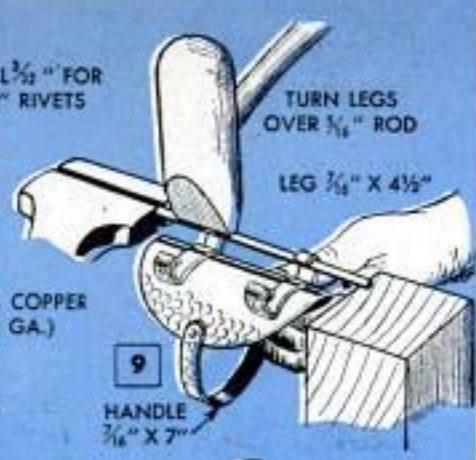




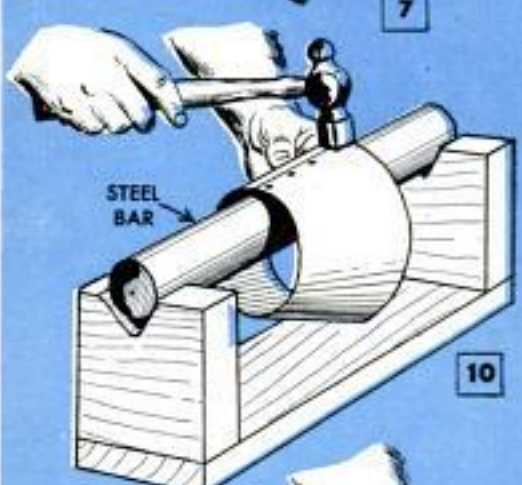
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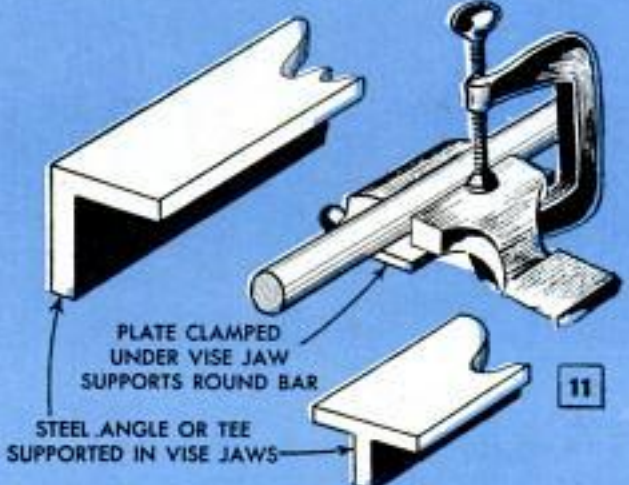
CIGARETTE SERVER



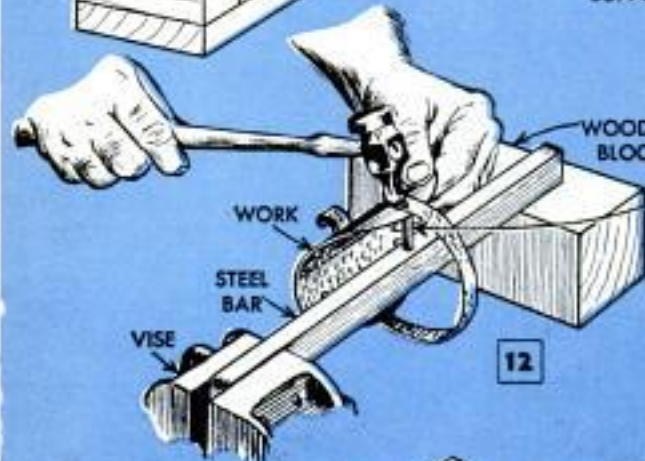
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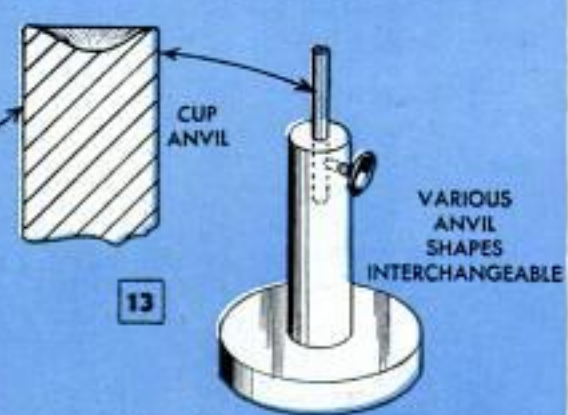
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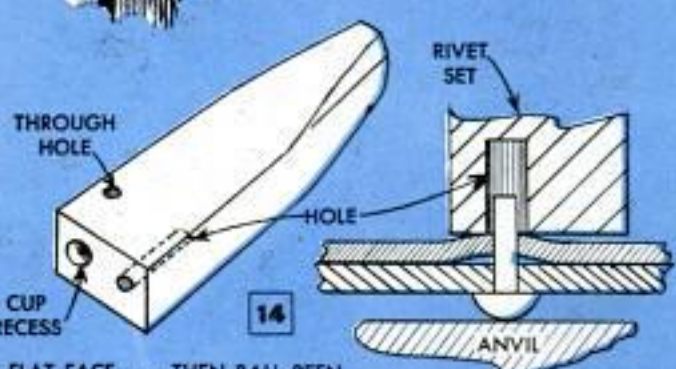
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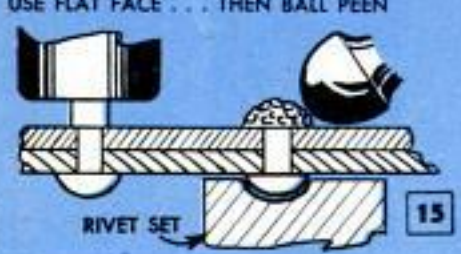


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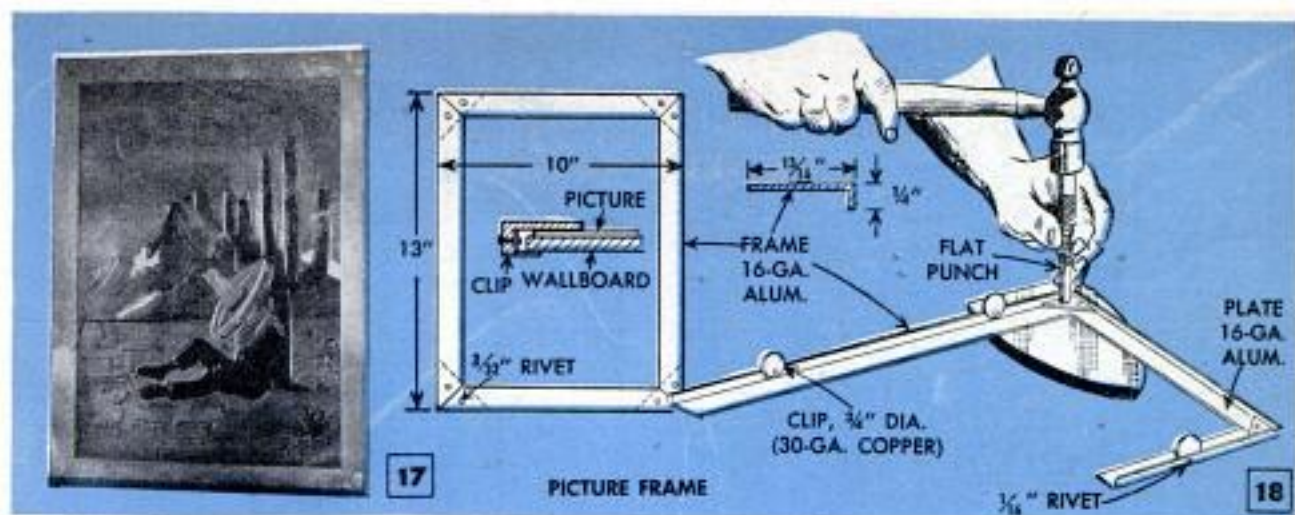
USE FLAT FACE . . . THEN BALL PEEN



15



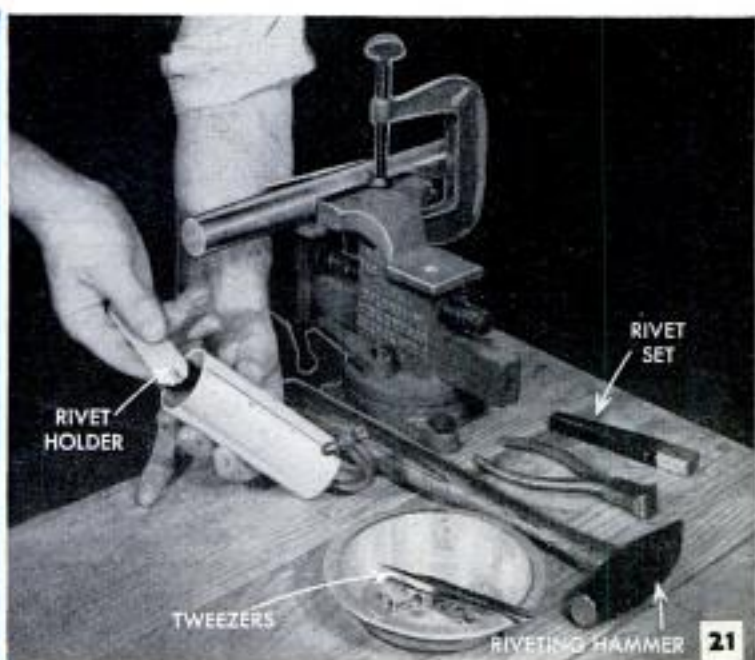
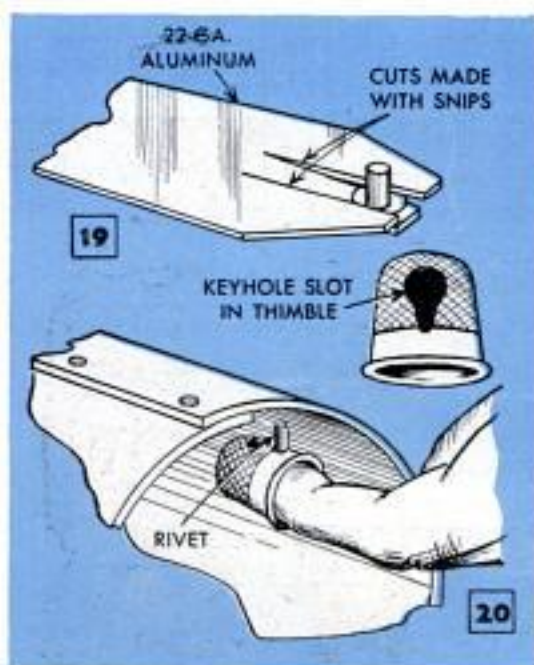
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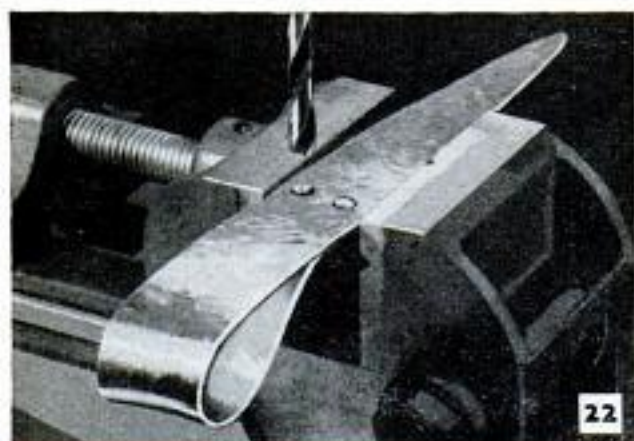


rivet. The hammer face should be well polished to impart a similar polish to the surface of the rivet head. If you want a round head, start by flattening the rivet slightly as in Fig. 15. Then strike the flattened rivet around the edges with a small ball-peen hammer. The surface on which riveting is done usually is a polished metal anvil. The sole plate from a discarded electric iron may be used for this purpose as in Fig. 18. The anvil will tend to flatten the round head of the rivet, but the effect is attractive. If you want to preserve the round head of the rivet, support it on a surface that is softer than the rivet but hard enough to keep the rivet from being driven back through the work. Use hardwood backing for aluminum, sheet aluminum over wood for copper and brass and solid aluminum or copper for iron rivets. Another way to preserve the round head is to use a cup anvil as shown in Fig. 13. The cup recess is one of the features of a rivet set, Fig. 14. Besides being used to support the rivet as an anvil, the rivet set can be

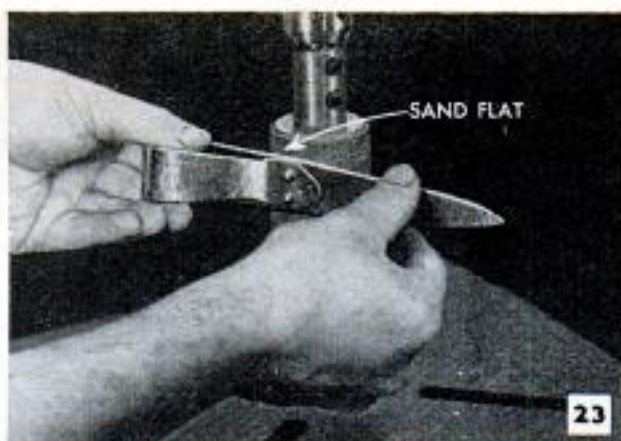
used to form a round head after rough hammering as in Fig. 6. The plain holes in the rivet set merely slip over the rivet to permit drawing the two parts tightly together before upsetting the rivet, as in Fig. 14. After this is done, the projecting shank of the rivet should be cut off with end-cutting nippers, shown in Fig. 5.

Work supports: Once you've started to do riveting work to any extent, it does not take long until you discover that special supports are needed for many jobs. However, the easily made fixtures shown in Figs. 9 to 13 inclusive and Fig. 16 will handle most jobs. You also can use most of these fixtures to support the work in the drill press when drilling rivet holes. But for burr-free work, nothing equals a clamp hold-down used in combination with a sheet of metal placed under the work as pictured in Fig. 2. In all cases, burring of the work can be minimized by using a drill which has a point of about 150-deg. included angle. Punching also results in burr-free holes and this can be done with

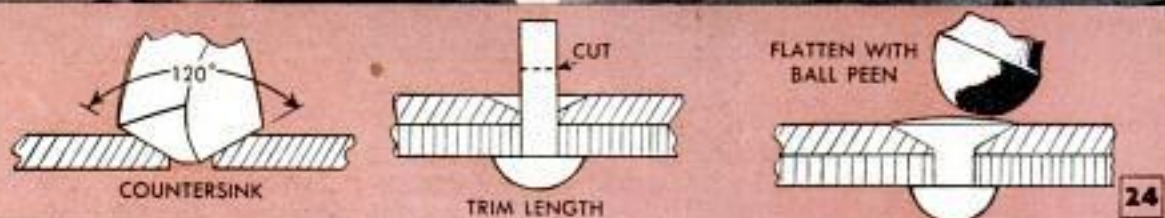




22



23



24

a bench punch or with the simple dies shown in Figs. 1 and 3. Fixtures for holding the rivet, Figs. 19 and 20, make it easier to insert the rivet in awkward locations. Fig. 21 shows the tools required for a simple riveting job:

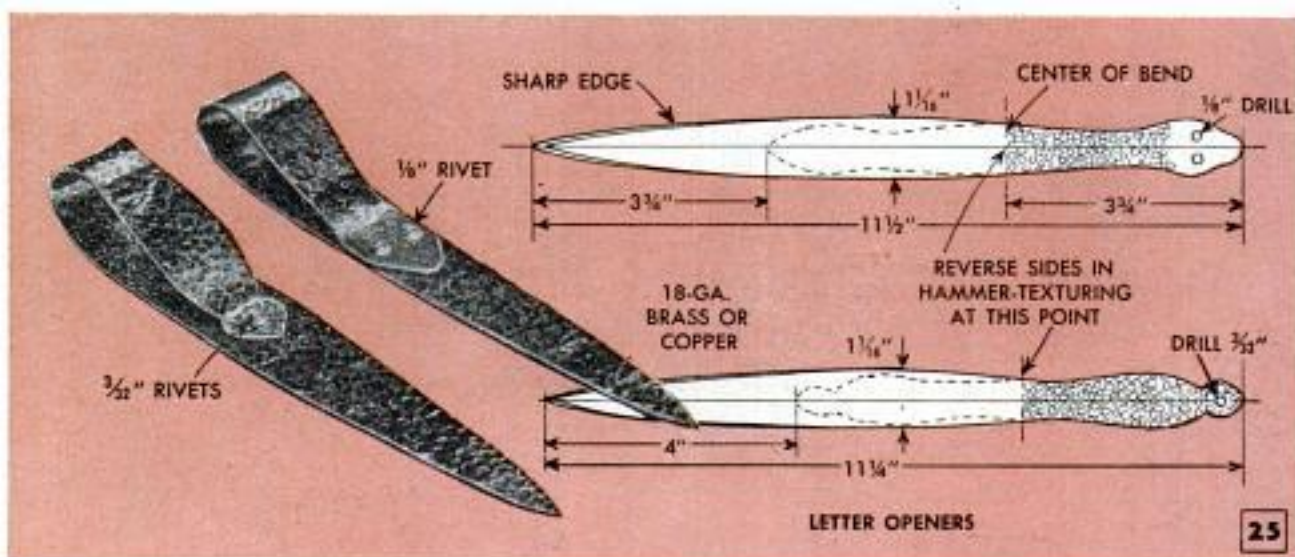
Flush riveting: Flush riveting can be done either by countersinking or dimpling. Countersinking, which is the most common method, is done by using a drill somewhat larger than the rivet hole, as shown in Figs. 22 and 24. After the work is countersunk, the rivet head can be hammered nearly flat and then dressed flush with the surface, Fig. 23. The rivet also can be left crowned if desired. You will notice that projects like the cigarette tray, Figs. 4, 7 and 8, the letter knives, Fig. 25, and the anchor book ends, Figs. 28 to 31, require flush riveting. Another flush-riveting method is called dimpling and is used whenever the metal is too thin to be countersunk. To dimple sheet metal, a die having a countersunk

recess is located under the rivet hole as in Fig. 26. A countersunk-head rivet may be used as a dimpling tool, and this is driven through the work and into the die, countersinking the work as it is driven into place. Figs. 26 and 27 show the spinning method of forming dimples.

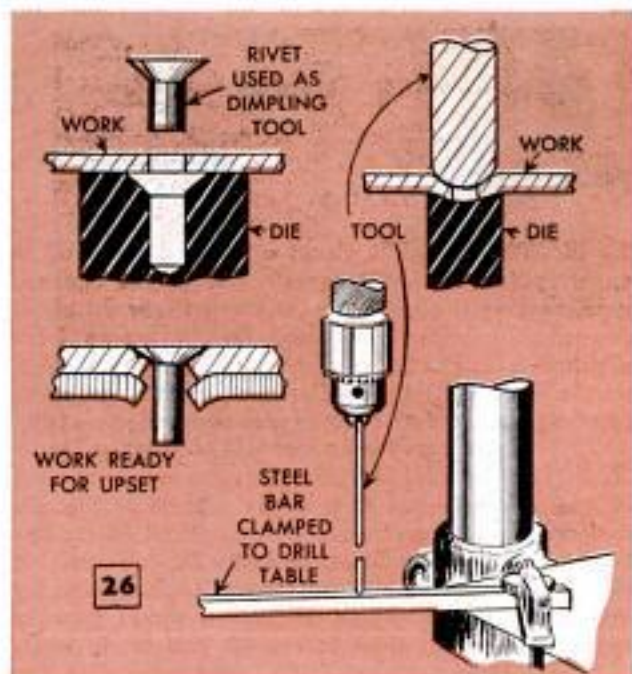
Making small rivets: To make a rivet from wire, just drill a hole of the required size through a piece of steel. Set the steel block on top of the vise, insert the wire through the block and clamp the lower end of the wire in the vise jaws, as in Fig. 29. Then peen over the upper end of the wire.

Projects: Of the four riveting projects pictured and detailed on these pages, all are finished bright except for the anchor book ends, Fig. 28, which are oxidized. The letter knife, Fig. 25, is a classic in riveting technique and general art-metal work. The picture frame, Fig. 17, is especially practical for mounting tooled-metal pictures.

★ ★ ★



25



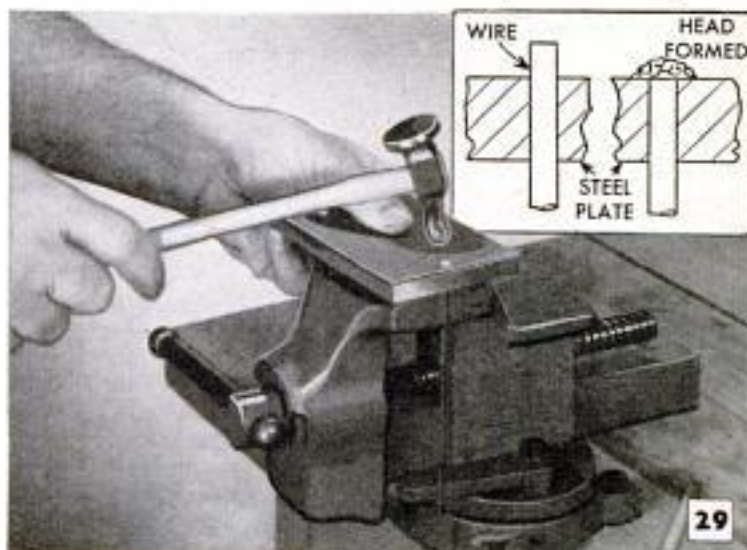
Above, flat-headed rivet can be used as countersink on light sheet metal. Right-hand detail shows alternate method, using round-end drill rod and hole in steel bar



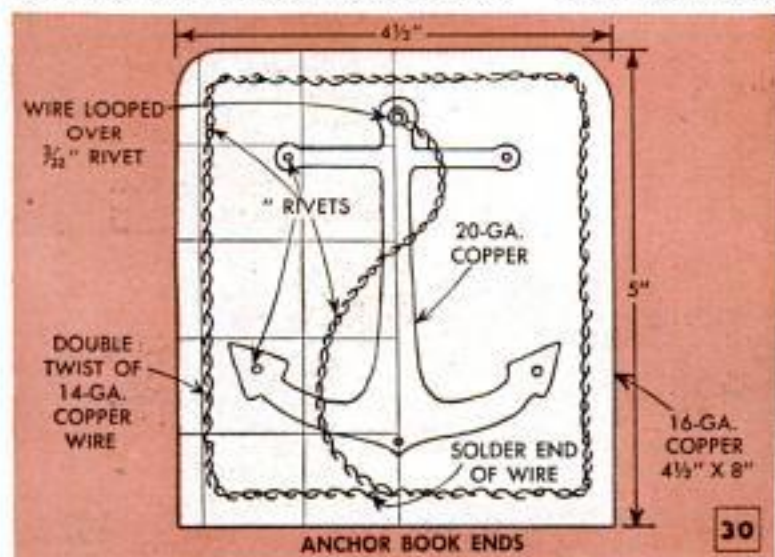
Above, round-end drill rod is chucked in drill press and used to "dimple" rivet hole in light sheet metal. Beeswax is used as lubricant to prevent scoring metal



Photo above and detail and photo below show nautical book ends of riveted construction. Length of twisted wire provides "rope"



Above, an assortment of rivet wire will furnish rivets of odd lengths and sizes. Wire is clamped in vise and allowed to project through metal-faced wooden block to permit forming head



SHOPPING FOR



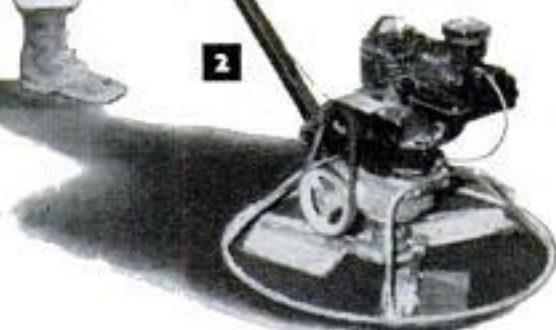
1



1. LEAKPROOF OILER places a single drop of oil in exact spot desired. Oil container is of the squeeze type, making it possible to control the amount of oil deposited. Lubricant is forced through valve from which it is conducted to the oil cup by means of a needlelike projection rigidly attached to the oiler. Fountain-pen size, oiler comes with cap and pocket clip

The Hughes Co., 8 West 40th St., New York City 18

2



2. POWER-DRIVEN TROWEL takes the hard work out of concrete finishing. It is easily carried to the job and operated by one man. Weighs about 70 lb. Upswept blades cover 24 in. and can be adjusted for floating, smoothing or hard trowel finish. Driven by 1½-hp. air-cooled engine through a worm gear to the blades. Works close in corners and along walls

Master Vibrator Co., 1752 Stanley Ave., Dayton, Ohio

3



3. MOTOR MOUNT is exclusive feature of new line of power tools. It has a new pivoting device which locks automatically in position. Each tool to be motor driven is provided with a mounting bracket and belt-tension rack. Works in either vertical or horizontal position. In mounting, motor rail is slipped into tool bracket. Pivot pin snap-locks it in place

Duro Metal Products Co., 2561 N. Kildare Ave., Chicago 39

4. PORTABLE TREE SAW permits the operator to "walk" through thick underbrush and small trees in land-clearing operations on farms, ranches and nurseries. Cuts trees up to 6-in. dia. within 3 in. of the ground level. Blade can be swiveled to any desired angle for cutting vertically or horizontally. Driven by a 5-hp. air-cooled engine mounted on hand cart

Mall Tool Co., 7740 S. Chicago Ave., Chicago 19



5. PORTABLE ELECTRIC JIGSAW is fitted with a special handle which gives better control and easier operation on hard-to-cut materials such as plastics, hardboards and laminates. Built-in blower clears sawdust from guide line. Fitted with a quick-change blade chuck that holds blade securely when locked. Motor is controlled by a recessed switch. Weighs 6 lb.

Dalton Mfg. Co., 20 S. Central Ave., St. Louis (Clayton) 5, Mo.



4

5



TOOLS

6. BACK STAND is designed to support long stock behind circular saw, bandsaw or jointer. It is adjustable for height and sturdy column is fitted with a wide three-point support so that it stands firmly in any position on an uneven floor. Wide roller is of hardwood to prevent marring finished stock. Telescoping section of column locks at any point by means of a palm screw. For extra-long stock, use in pairs

Design Associates, 1924 Greendale Ave., Park Ridge, Ill.

7. HOLE CUTTER for installing electrical outlet boxes in dry walls eliminates plaster-patching openings after installation of boxes. Consists of a two-piece die, the outer half of which is snapped into the switch box before dry-wall sheet is nailed in place. Next, cut with a hole saw at approximate center of box. Two members of die are engaged through hole locking being automatic. Then close cutter handles

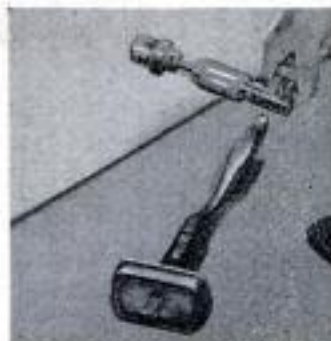
Hartmeister, Rm. 8, 2020 W. Barry Pl., Denver, Colo.

8. DOUBLE HACKSAW permits use of two blades on the same frame. This is especially useful when the work requires the use of blades of different tooth spacings. Handle is designed for a comfortable grip when using either blade. Tubular frame has a removable end cap so that tube can be utilized for storage of spare blades. A turnbuckle tensioning device maintains an equal tension on both blades while in use

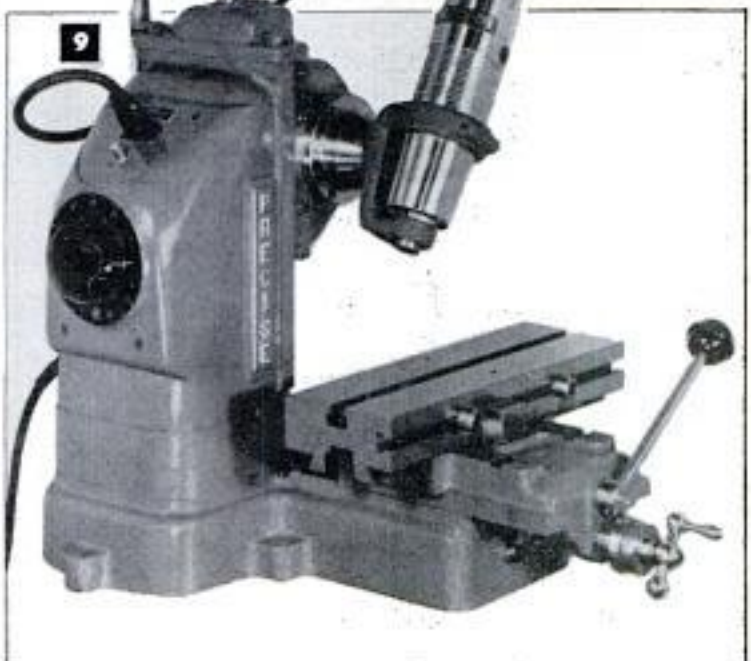
Dreier Brothers, Inc., 5642 Lake Park Ave., Chicago 37

9. BENCH MILLING MACHINE is designed for milling operations on small precision parts at speeds up to 45,000 r.p.m. with carbide cutting tools. Universal head adjusts to any position through 360 deg. Work surface of table is 4 x 12 in. Table has standard 1/2-in. T-slot and is mounted on dovetail slides with an adjustable gib. Hand-lever feed is 5 in. and saddle travels 3 in. Micrometer-type feed screws are available

Precise Products Corp., 1328 Clark St., Racine, Wis.



7





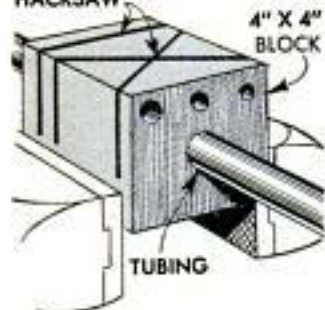
Fire Extinguisher on Farm Tractor Mounted Within Easy Reach

Taking no chances in the event of a fire while working in the field, one farmer mounted a small fire extinguisher within easy reach on his tractor. Clamped in a U-shaped bracket bolted to the steering post, the extinguisher is always close at hand during operations where the fire hazard is exceptionally high, as is the case, for instance, when using mounted corn pickers on dry, windy days.

A. M. Wettach, Mt. Pleasant, Iowa.

Tubing Cut in "Miter Block" Made From Hardwood Cube

SAW KERFS FOR HACKSAW



Having frequent need to cut tubing at a 45-deg. angle, one mechanic made a "miter block" from a 4-in. block of hardwood. Holes of a diameter to accept various sizes of tubing were drilled through the end

grain of the block, then 45-deg. and 90-deg. saw cuts were made in one face of the block to intersect the drilled holes. The miter block should be clamped in a vise when it is being used.

William B. Eagan, Louisville, Ky.

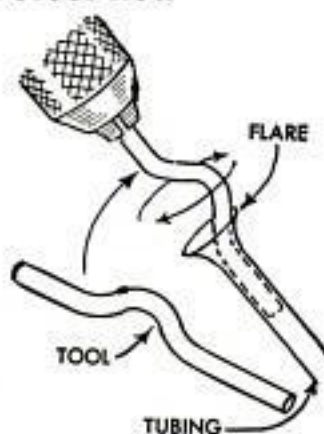
Chain Hooked to Out-of-Reach Eye With Aid of Hose Extension

Desiring to hook a hoist chain onto a ceiling eye without the use of a stool or a ladder, one mechanic slipped a length of radia-

tor hose over the chain just below the hook to serve as an extension handle. The hose proved sufficiently stiff to support the chain in an upright position, thus making it possible to reach the eye and hook the chain onto it with little difficulty.

Flaring Tool for Copper Tubing Improvised From Steel Rod

In an emergency when a regular flaring tool is not available, the ends of copper tubing can be flared by using a tool shaped from a nail or steel rod of the same diameter as the inside of the tubing. The rod is shaped to approximate the angle of the flare



and chucked in a hand drill or brace. The tool is dipped in oil; then, while being turned, it is forced gradually into the tubing until the correct flare is obtained.

Tin Cans Fitted Over Jar Lids Provide Lathe-Chuck Storage

Ordinary tin cans, fitted over jar lids, may be used to provide dustproof containers for storing various kinds and sizes of lathe chucks. As shown in the illustration, the jar lids are screwed to a length of 1-in. stock, wide enough to hold the largest chuck. Tin cans, of a size to cover the various chucks, are fitted over the lids.

Hugh Botts, New York City.



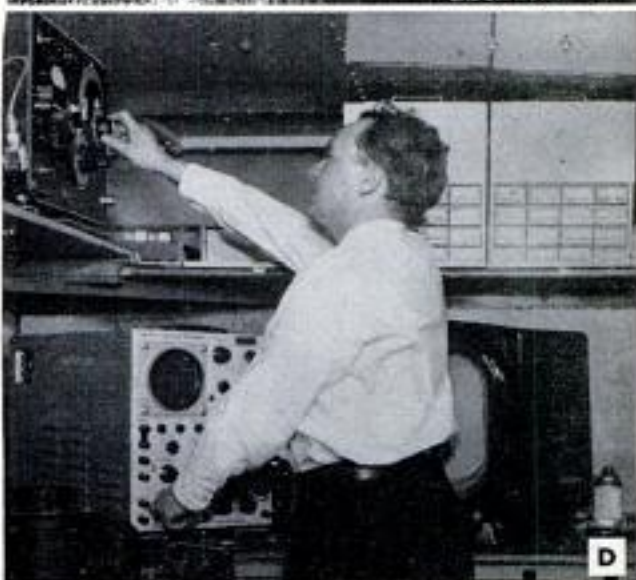
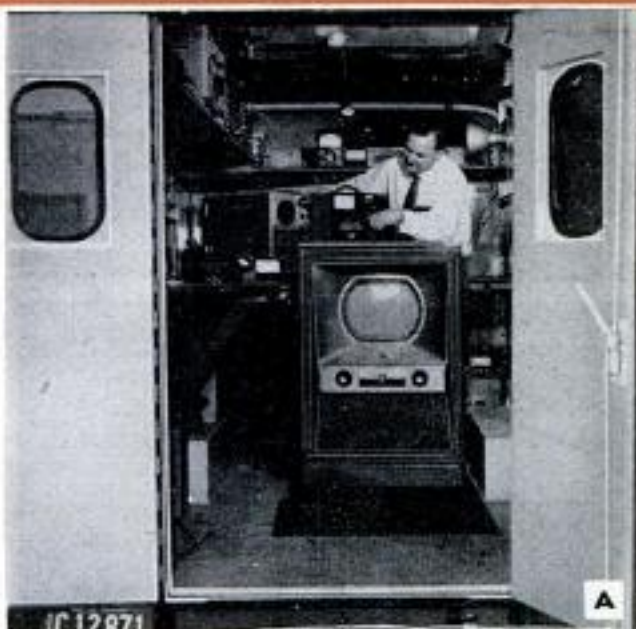
Radio TELEVISION Electronics

COLOR-TV FIELD TESTS

ALTHOUGH most small-town and rural residents have seen very few color-television receivers or programs as yet, they may have watched in operation a truck which is responsible for some of the most advanced color-TV research going on in industry today.

Photos A, B and D show various views of the truck which contains the Motorola Mobile Television Laboratory that has been roaming the country testing and re-testing all aspects of color-TV engineering. This mobile laboratory is an invaluable tool for analyzing problems and new developments "on location." The complicated circuitry of color TV and the new problems it brings require such field testing. Simulating fringe or interference problems is a simple procedure with a mobile laboratory as it can move right into the trouble area for the desired check and correction of many difficulties never even suspected in plant laboratories. Photo A shows a receiver under test on location. Not only color, but all new developments in TV including antenna arrays can be tested. In photo B the engineers are raising a UHF array on the tower attached to the rear of the truck; this tower will extend to a height of 60 feet. Photo D shows an engineer testing UHF reception in a fringe area.

Partly as a result of the extensive testing, the manufacturer enters the color-TV market with one of the first large, 205-sq.-in. screen receivers, illustrated in photo C. An unusual feature of this model is placement of two 7-in. oval speakers above the picture tube, directing the sound to ear level.

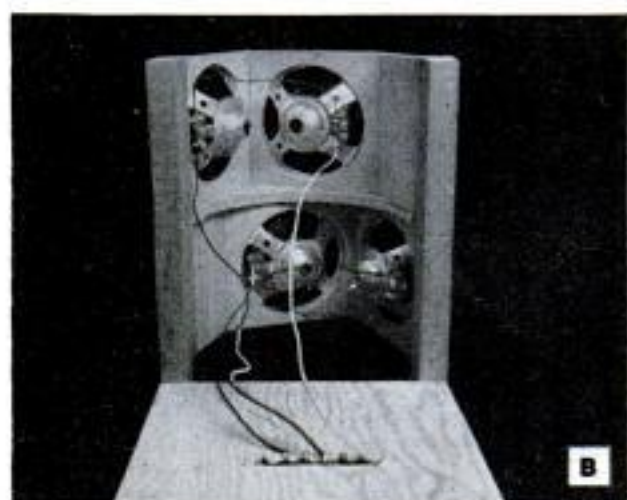


TWO LOW-COST HIGH-FIDELITY

By Dr. R. C. Hitchcock



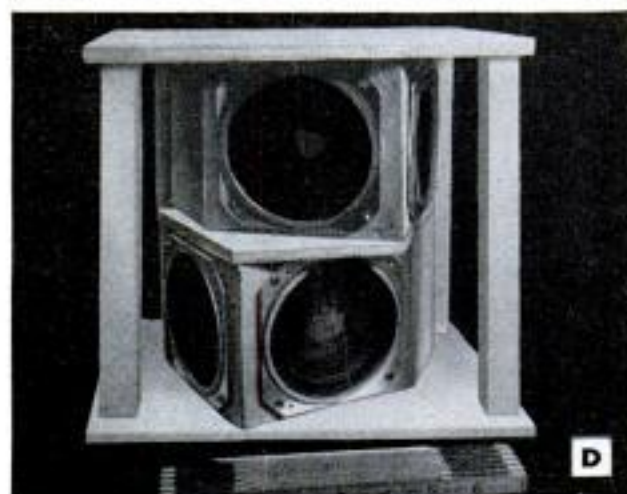
A



B



C



D

BASED ON *sound* principles, multiple-speaker systems are increasing in popularity. The reason for this is that several inexpensive permanent-magnet (PM) loudspeaker units can outperform a single expensive loudspeaker unit. Here are two up-to-date designs with superior performance and each uses four PM speakers.

Loudspeaker enclosures must not vibrate. These enclosures are sometimes made of heavy wood but, in the designs shown here, lightweight plywood, securely braced, is used as much as possible. In these designs the speakers are angled to spread the high tones in four adjacent overlapping beams of sound. No crossover networks are needed when all speakers are identical.

The infinite baffle unit illustrated in

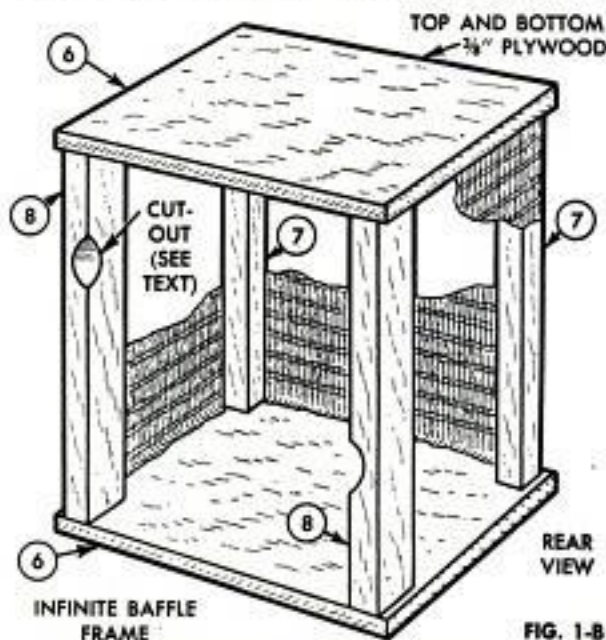
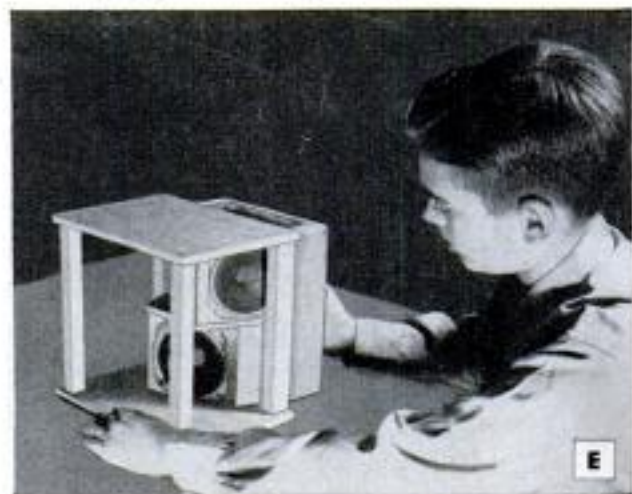


FIG. 1-B

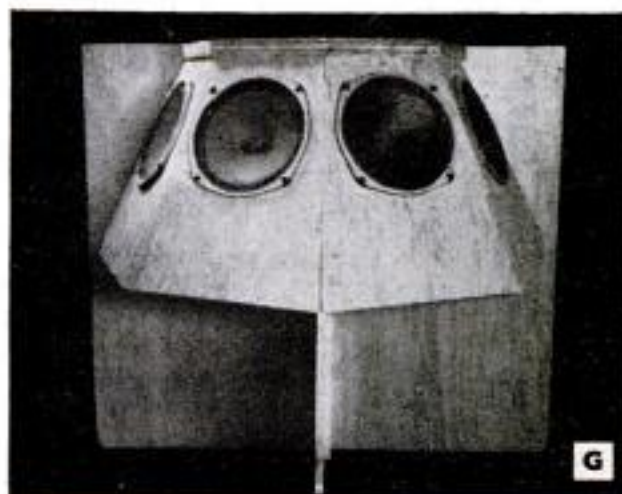
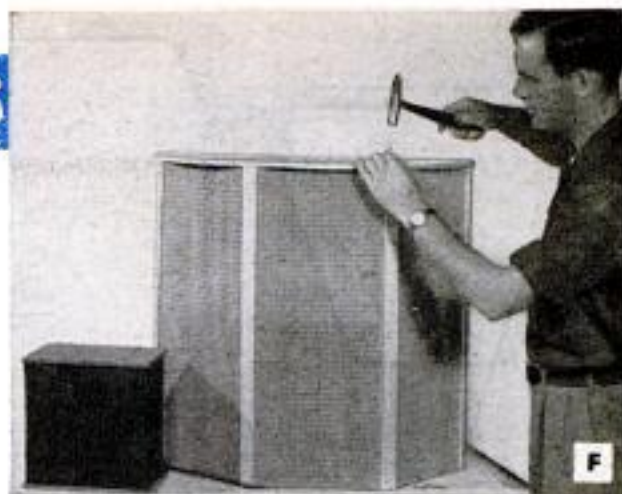
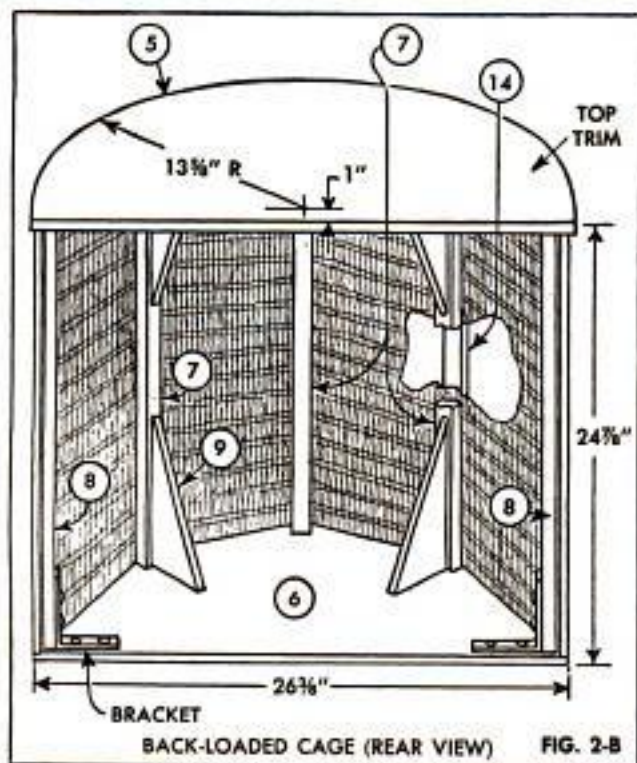


E

MULTIPLE-SPEAKER ENCLOSURES

photos A, B, C, D and E is an ideal solution to the "second speaker" problem. Back-loading is not practical for a small unit so a completely enclosed box is provided. Construction details are shown in Figs. 1 and 1-B. A piece of glass fiber, $\frac{3}{4}$ x 13 x 9½ in., should be fastened to the inside of the back panel over the terminal strip, to absorb radiation from the speaker units. This unit has a maximum input of 3 watts, it employs four 4-in. PM speakers and weighs 4 pounds. It may be used as a main speaker for a table-model radio or as a remote speaker. A narrow cutout is made in the back panel (item 5) for the 6-terminal strip and the internal and external connections are made as shown in Fig. 1-A. Although the complete unit is small and light in weight, it will sound better than most radio speakers, even 8-in. ones. When used as the main speaker for a table radio, the connection should be 4 ohms. If used as a remote, or second speaker, it can be connected for 16 ohms, so as not to absorb too much energy from the main speaker. Use ordinary rubber-covered lamp cord for connecting cable to remote locations; do not use hookup wire or bell wire.

Multiple-speaker systems must have all speakers work in unison, that is, all cones must go out, and come in, at the same time. This is easily checked with a 1½-volt dry cell. Connect them all in series and com-



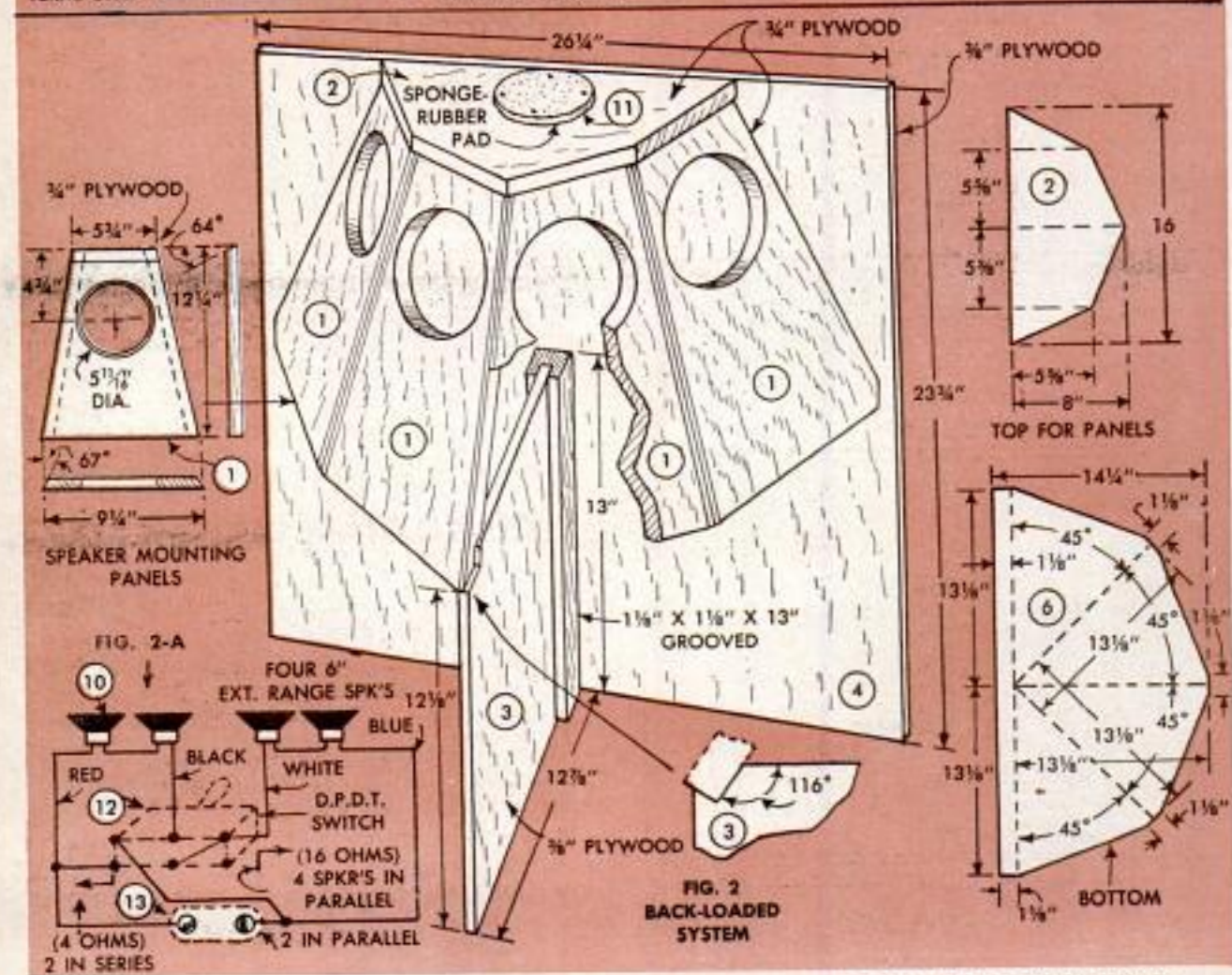
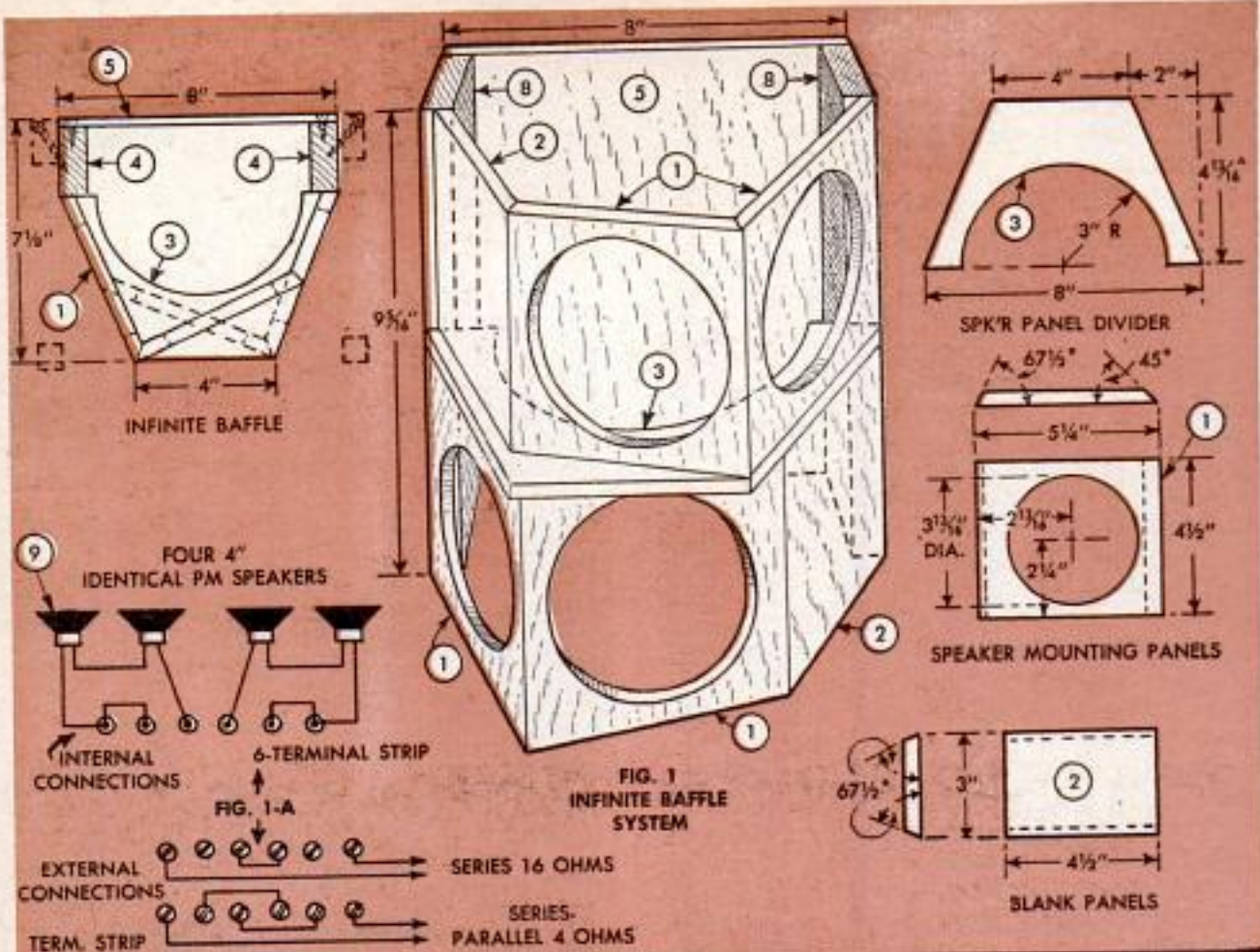
plete the circuit through the dry cell momentarily. If one of the speakers is not "in step" merely reverse its wires.

Use a good grade of glue, and headless brads for construction. Two notches in the back pillars of the infinite baffle are provided for insertion of a screwdriver to remove the tight-fitting speaker assembly from the baffle frame, see Fig. 1-B. Screws are used to fasten the back and also to hold the baffle unit to the frame; see sketch at upper left in Fig. 1.

The back-loaded system illustrated in photos F and G, and Figs. 2 and 2-B, has a maximum input of 15 watts; it employs four 6-in. PM speakers of the extended-range type and weighs 22 pounds. It is designed for use as a highly efficient speaker in high-fidelity phonograph systems where back-loading can be used to advantage. It may also be used in small auditoriums with PA systems. When a microphone is used the speakers must face away and be placed at least 10 ft. from the microphone. Complete construction details are illustrated in Figs. 2 and 2-B.

The d.p.d.t. switch and output-terminal connections are shown in Fig. 2-A. This switch, when thrown one way connects two speakers in series for 4 ohms; thrown

(Continued to page 352)





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Here's how B-C works

A small 22.5-volt photoflash battery feeds power to a condenser which stores the power until needed. When you trip your shutter, the con-

denser, fully charged between shots, fires the lamp in a single surge *many times as strong* as the force of the usual 1.5-volt flashlight batteries.

Now you can see right away that the B-C method offers you some really important advantages. First of all, of course, is the fact that you get full voltage on every flash shot. Secondly, B-C assures positive and reliable timing even when the battery begins to weaken. Thirdly, the condenser charge is so powerful that it will fire several bulbs at once (instead of having to have an additional set of dry cells for each flashholder). And when the circuit is wired in series, all the bulbs fire at the same instant—no laggards. And to top it off, B-C is thrifty. It avoids failures and misfires that waste bulbs and film. Generally speaking, a single leak-proof battery is good for thousands of shots . . . does the job of several ordinary batteries.

On the opposite page there's a guide on how to choose just the right B-C Flash for your needs. Your photo dealer will be glad to help you select the equipment that's best for your camera.

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For simple flash photography, choose the KODAK B-C FLASHHOLDER

If you plan to use from one to three flash bulbs at a time, the sturdy, low-priced and popular Kodak B-C Flashholder will serve your needs very well indeed. It takes the inexpensive, readily available "midget" bulbs (SM, SF, No. 5 or 25). Its new Lumaclad reflector gives you 50% greater light output than matte-surfaced reflectors, has a handy exposure guide printed right on it. The quickly adjustable bracket fits most flash-shutter cameras, is easily removable for off-the-camera flash. Has transparent flashguard (for protection if a bulb should break) and "pop-out" type bulb ejector. A real value at \$9.95*. Flashholder also provides connections for one or two Extension Units for multiple lighting. Each unit, with 20-foot cord and cushioned, adjustable clamp, \$11.



If you're interested in advanced flash, you need the KODAK EKTALUX FLASHHOLDER

For advanced photoflash work you'll want the Kodak Ektalux Flashholder. B-C powered, it simultaneously fires up to 6 bulbs employing up to 120 feet of extension cable. Magnesium-constructed for durability and light weight, it fits most types of cameras. Features convenient, pistol-grip handle; removable, easy-to-pack reflector; quick load-eject sockets for both midget and medium-base bulbs. Addition of solenoid permits tripping shutter from Flashholder; a Synchro-Switch permits external synchronization if needed; Remote Release Cord permits exposure control up to 20 feet from camera. Brilliantly meets the most exacting tests of flash taking. From \$29.75*

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*Batteries not included

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Care and Feeding of Engines

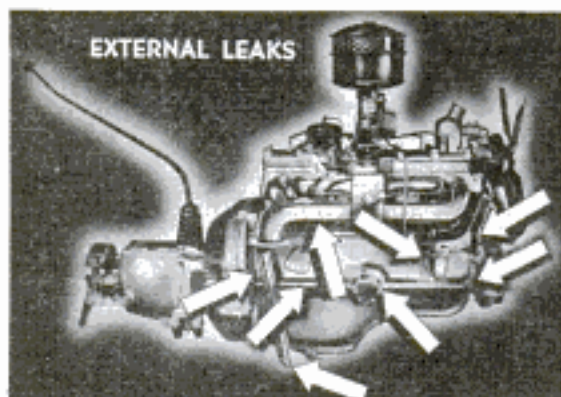


BY
S. P. CORP

EXCESSIVE USE OF OIL

Before you decide to correct oil consumption by installing Sealed Power KromeX Ring Sets consider these alternatives:

- 1. FAST DRIVING AFTER SLOW DRIVING.** If you have been driving slowly in town, condensation has probably diluted your oil. If you then go on a trip, with prolonged high speed driving, engine heat will evaporate the dilution, showing a lower oil level. This is normal and does not mean trouble.
- 2. CONTINUOUS HIGH SPEEDS** over 60 mph always cause engine to use more oil than lower speeds.
- 3. IMPROPER READING OF OIL STICK** will result if car is not level or stick is not pushed way down. Let engine be stopped a minute before checking oil, to let oil drain down into crankcase.
- 4. USING A LIGHTER OIL** than the specified grade for prevailing temperatures will increase oil use.



- 5. CHECK FOR OIL LEAKS** at the points indicated on the diagram. Replace any gaskets or oil seals which are found to be leaking.
- 6. VACUUM PUMP DIAPHRAGM** may be cracked which can cause oil burning. Replace diaphragm if damaged.
- 7. WORN VALVE GUIDES** may waste oil. Valve guide oil seals may correct this condition.

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Roof Decking

Q—I'm planning a new home with a studio living room in which the rafters will be exposed. My problem is what kind of roof boards and insulation to use on this type of roof. I'm told there are several methods. But what is applied over the rafters in order to obtain a smooth surface for finishing?—K.F., Colo.

A—There are, as you say, a number of methods of applying the roof decking over a studio room. One procedure that has become fairly common is the application of selected knotty-pine roof boards over the rafters. These are covered with aluminum foil and then the weather roof is applied over this. Such a combination of materials seems to prove quite satisfactory. However, regular procedures have been greatly simplified by the introduction of a new laminated roof decking, the underside of which provides a prefinished ceiling. It is suitable for use anywhere the roof decking is exposed in the room below, as in flat or pitched roofs of any type. The insulation is incorporated in the material itself, thus saving installation time for the builder. Also, the insulation is more efficient percentage-wise as the entire roof area is covered and not just the spaces between the rafters, as is the case in some installations.



Floor Over Slab

Q—I want to lay a hardwood floor over the concrete-slab floor. I have only lately decided to do this. The concrete floor was laid without any provision for attachment of furring strips. I would rather have oak flooring boards than any type of wooden flooring squares. Is it practical to attempt this job?—P.W., W. Va.

A—Yes, but it will require the expenditure of considerable time and labor if you want a top-notch job. We hesitate to recommend that you undertake it because of the labor and materials involved and also the fact that everything in the house must be moved out in order to carry out the procedure in detail. However, if you wish to go through with the process, the first step is to clean the floor thoroughly and make sure that it is dry. Effective protection against moisture from below,

(Continued to page 254)

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(Continued from page 252)

also against insects, is obtained by mopping on an asphalt-coated felt membrane with hot tar. Where possible, the membrane should be carried up the walls from 2 to 4 in., or to a point where it will be covered by the baseboard. Be careful not to get tar on the walls above the extension of the membrane. Instead of laying furring strips, it's a common practice to lay what are known as screeds to provide a nailing surface. These are short lengths of 2 x 4s, usually about 30 in. long, laid flat side down and embedded in asphaltic mastic with the ends lapping in the manner shown in the sketch. It's the usual practice to space the screeds on 12-in. centers. Spaced on 12-in. centers with the ends lapped past about 6 in. the screeds provide a solid nailing surface for the flooring. This offsets any tendency to springiness and prevents the development of squeaks. It's a good idea to dip or coat the screeds in a wood preservative before laying.



Locating Thermostat

Q—I'm installing my own forced-air heating system. I have five rooms with a large, square living room. Furnace is in the basement and directly under the center of the house. Where should I place the thermostat?

T.K., Ky.

A—You pose a question difficult to answer with certainty without knowing more about the relation of the various rooms, exposure to prevailing winter winds, location of the warm-air registers and placement of the cold-air returns. All these are determining factors, to a greater or lesser extent. Ordinarily, the thermostat should be located in the most lived-in room of the house, usually the living room in a small home. Most thermostats are extremely sensitive to changes in temperature; even the small hole in the plaster through which the wires are led to the terminals may admit sufficient cold or warm air to affect the operation of the unit. Avoid placing a thermostat where there may be currents of warm or cold air or on an outside wall which may become very cold during a period of severe winter weather. Be sure that the 'stat is not placed on a wall near a warm-air riser leading to an upstairs room, or opposite the kitchen range, or where a current of warm air from a register can strike it directly before being dissipated throughout the room. The thermostat should not be placed at any point on a wall where direct sunlight will strike it at any time during the day.

Bubbles in Varnish

Q—Recently I varnished an antique on which I had spent considerable time and effort in removal of the old finish and sanding of the wood. Although the varnish dried satisfactorily, the surface was very rough due to innumerable bubbles which appeared as it was spread. It seems impossible to sand or rub them out. Can you tell me the cause?

O.B., Vt.

A—Did you shake the container before applying the varnish? If you did, then there's one of the most common causes of trouble with bubbles in either varnish or shellac. This is especially true if the material has aged somewhat or has thickened slightly due to exposure to the air. It is permissible to stir varnish or shellac before applying, but this should be done very lightly and the container should be allowed to stand for a few minutes before the materials are applied. Of course, there are other causes, some more difficult to determine. Sometimes the brush used is at fault, or the manner of application. The brush may be contaminated with other materials which react with the oils in the varnish or the alcohol in shellac to produce the objectionable bubbles in the surface film after application. In some cases, quick, hard strokes of the brush will result in bubbles unevenly distributed over the surface of the work. In your case we would suggest that you remove the present finish back to the bare wood and begin over again with fresh finishing materials. We think it likely this will prove the surest remedy.

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The House You Asked For

(Continued from page 150)

In regard to kitchen arrangement, 68.4 percent asked for a breakfast area. The dining-room situation was not so simple and presented Architect Matern with a problem. There was a 34.9, 34.8 and 31.3 vote on (1) combination living-dining room, (2) combination dining-kitchen and (3) separate dining room, respectively. Matern's solution was a provision for dining-room space that can be separated by a screen from the living room. Further privacy from the porch side could be provided by draperies to cover sliding glass doors.

In planning the house, Matern did not ignore minority preferences. "I tried to work in features that would make everybody happy," he explains. "For example, the 27.6 percent who wanted only two bedrooms could use the third bedroom as a den or television room. And the 7.6 percent who wanted a split-level house might be content with having the two rear bedrooms and bath three steps up from the main floor of the house. The flat-roof fans (13.2 percent) should like the treatment of the garage and porch. There were 28.1 percent who wanted frame. The garage and one small section around the rear entrance are frame. Although we are showing the house in brick, it could, of course, be built with wood siding."

Some 58.8 percent voted for the open-plan arrangement of rooms. Matern achieved a fine open sweep of space in the living-dining-foyer and porch areas. When the glass sliding doors to the porch are open there is a full sweep from the living-room fireplace to the wall of the garage on the far side of the porch. Matern points out that those desiring more open planning than shown in the plans could easily lower the walls of the den-bedroom or use sliding or folding partitions between this room and the hall and living room. He reserved a special treat and another outstanding feature of the house for those who wanted the dining-kitchen arrangement. The eating space in the kitchen far exceeds average requirements for breakfast. This area with skylight and windows facing the garden patio is one of the most interesting parts of the house.

Exactly 52 percent specified 1½ baths. Many readers asked that the half-bath be close to the kitchen. Matern placed it not only close to the kitchen but also the den-bedroom. The baths are back-to-back for the economical use of a single plumbing stack. A typical comment on this subject came from a Plymouth, Wis., reader: "I

(Continued to page 260)

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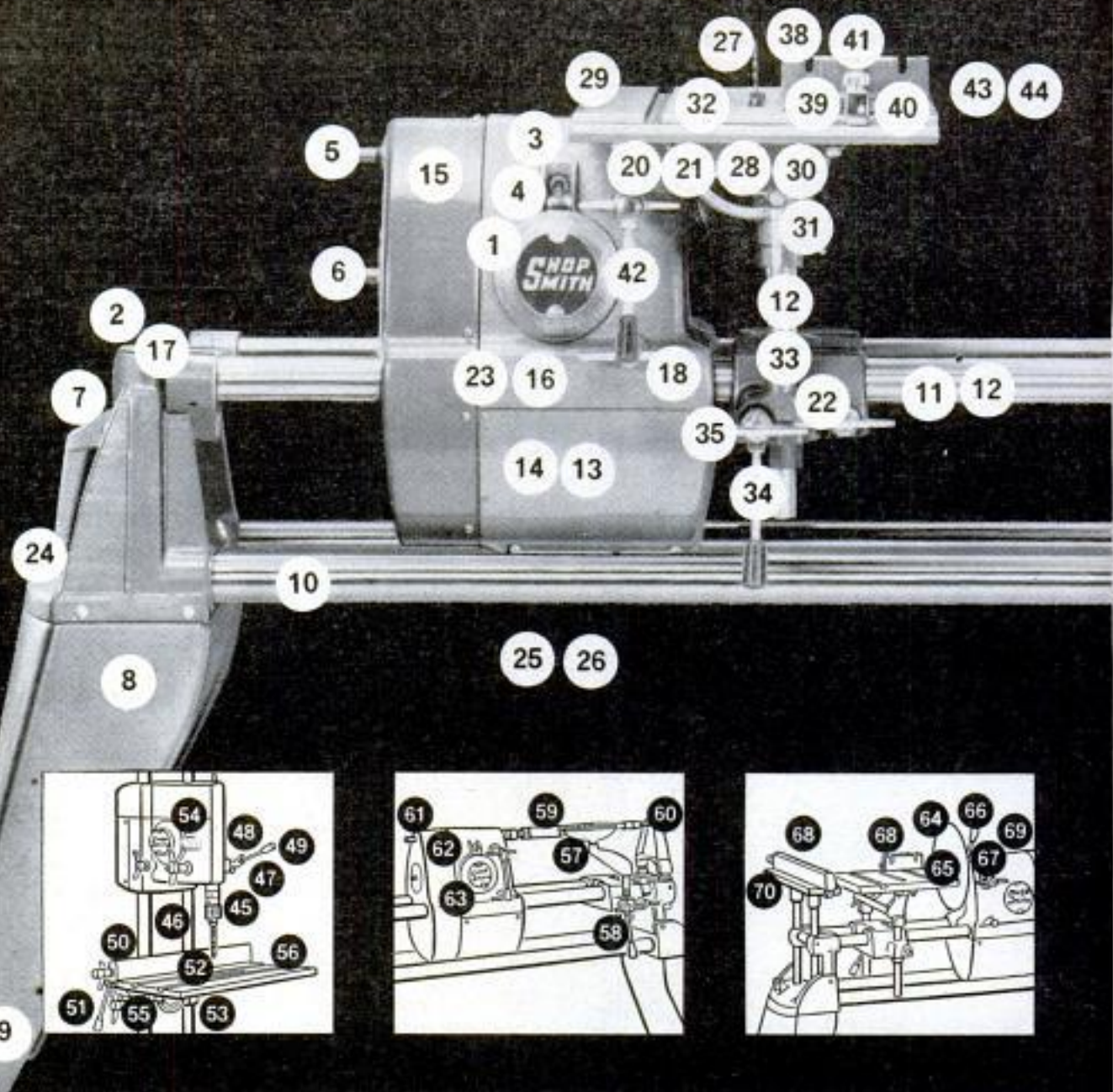
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Capacity—up to 48". 44. Effective Table Area—18 $\frac{3}{8}$ " x 56" with standard extension.

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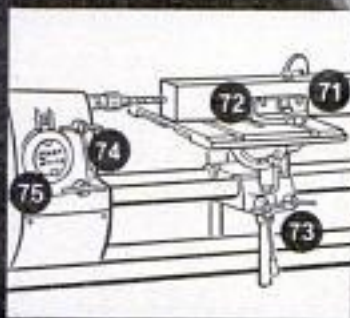
—16½" swing, 34" between centers. **60. Eccentric Cup Center Mount**—easily offset up to ½" for turning 1" tapers over length of workpiece. **61. Extra Spindle**—for mounting honing wheel to sharpen chisels between cuts. **62. Movable Headstock**—slides to end of ways for easier faceplate turning. **63. Variable Speed Selection.**

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64. 12" Sanding Disc—statically and dynamically balanced. **65. Undercut Table Edge**—for 45° angle sanding without chatter. **66. Quill Feed**—allows sanding disc to be fed into work. **67. Quill Feed Stop**—for accurate duplicate sanding. **68. Miter Gauge and Rip Fence**—provide handy jigs. **69. Extra Spindle**—for mounting drum sander or another sanding disc. **70. Fence Offset Screw**—quickly offsets fence for accurate edge sanding and jointing of plywood.

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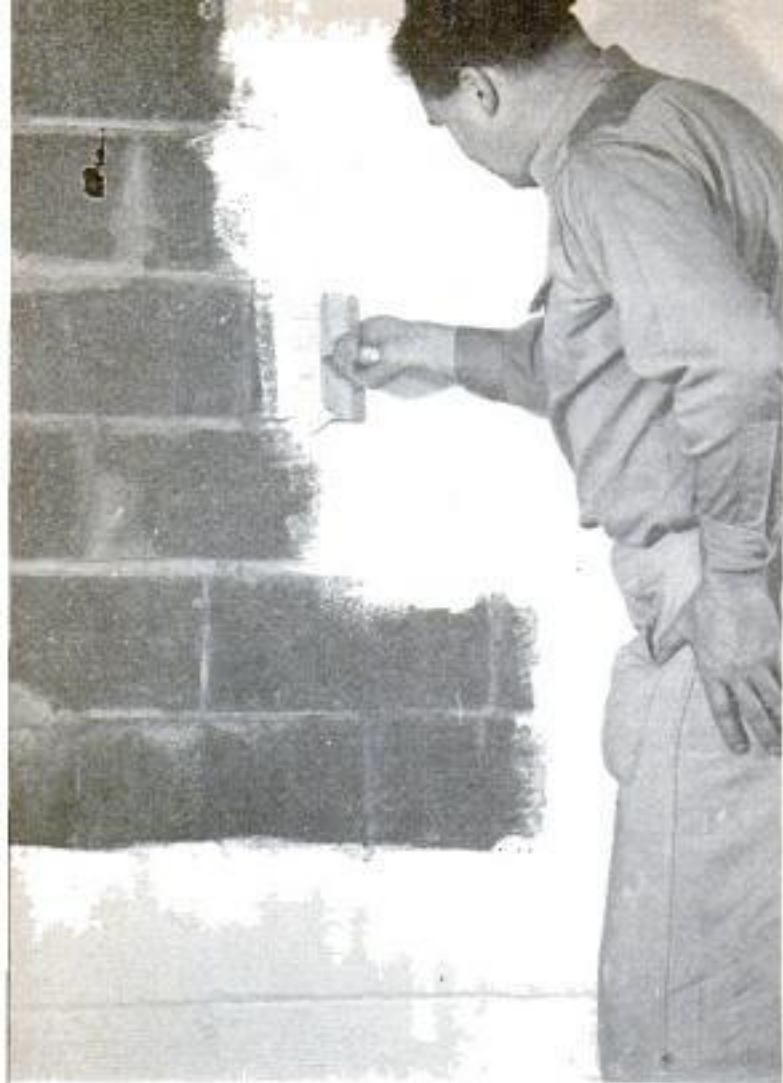
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would have a minimum of hall space with the bath close to the kitchen and arranged so you wouldn't go through the living room from the kitchen to go to the bath or the bedrooms." The architect's excellent solution for the handling of traffic to and from various rooms is quickly recognized by a glance at the plans.

A total of 33.2 percent requested a utility room (with space for washer and drier) adjoining the kitchen. Although the laundry is shown in the basement on these pages (in accordance with the majority preference) there is actually space in the kitchen for both washer and drier.

Bowing to the dictates of the 74.2 percent who asked for an outdoor living area, Matern has presented both garden patio and screened porch. During the warm months the porch functions as an extension of the living-dining area. The porch can be screened or not—depending on whether you live in the "mosquito belt."

Due to a vote of 48 percent, the house is shown on these pages with a brick-veneer exterior finish. If some kind of wood or shingle siding is used, Architect Matern urges uniformity of material across the front of the house. The structure would look much smaller, he points out, if the porch wall at the front were of different material.

A careful study of the house will show the tremendous possibilities for variations of the plan. It could be built with a carport or carporch in place of the screened porch and garage. These could be added later if the budget-conscious builder desires. Also, the house could be built without a basement. In this case the laundry would be moved to the kitchen and the garage workshop enlarged. The plans give the choice of a two-car garage or a one-car with additional storage space.

The price section of the questionnaire was presented with this admonition: "The home price you select should not be more than 2½ times your annual income, unless you have savings in addition to the minimum down payment. Your other selections should also take price into consideration. For example, a \$7000 home with three bedrooms would be very small and, unless you built it yourself, such items as a fireplace, air conditioning and two bathrooms would be out of range." The result was that 57.4 of the readers fixed the price they could pay, not including the lot, at between \$10,000 and \$15,000.

In designing the house with a floor area of 1275 square feet, Matern gave careful consideration to the survey. He was also influenced by the fact that 16.5 percent said

(Continued to page 274)

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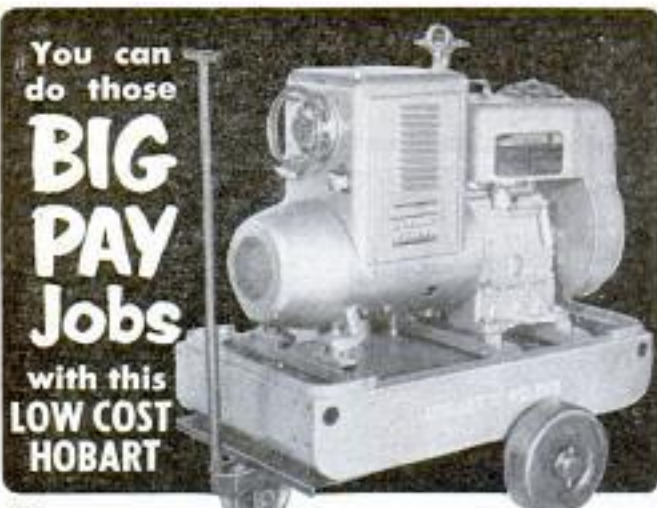
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CITY _____ STATE _____

Buffalo, Cattle—and now Oil

(Continued from page 109)

rolling hills. This is the country of the last big buffalo hunts in the eighties. The buffalo country gradually turned into range and wheatland. Now, high on a rocky knoll stood a half dozen palomino horses—looking across the valley at a cluster of oil wells.

Pulling up at a throbbing pump that was lifting "liquid gold" from deep in the earth, I asked young Ivan Kohlman how he liked his lonely pump-watching job.

"Fine," he said. "Used to work on a wheat farm, but this job has farming beat all hollow. Fourteen hours a day on the farm, eight at the pump."

The question that may develop into a serious one in the area: How you gonna keep 'em down on the farm—when there's oil or at least an oil job, to be had?

Oil has changed Glendive's way of life for the second time in the current century. Glendive used to be a roaring rendezvous for cattlemen. Cattle raising is still important, but early in the century major interest shifted to dirt farming. And now it has shifted to oil production.

"A trainload of oil pulls out of Glendive daily," reported A. O. Greenwood, retired freight conductor, at his hotel-corner observation post. "When I started working out of here in '17, sugar beets and grain made up the big loads. Since they struck oil here in '51, the population has gone from 4500 to 6000 and they say it'll be 25,000 within the next five years."

Billings is west of the Williston Basin proper but, because of its strategic shipping location, the city has become a major Western oil capital. Already in operation are two huge refineries. At a service station, I talked with attendant Don Nave.

"Got a lot of Texans and Oklahomans up here now," said Nave. "Take a look at the oil section in the business directory of the telephone book. You'll be amazed."

I was. Listed were more than a hundred oil firms. Wyoming and Colorado concerns even carry their long-distance numbers in the Billings directory.

Already, 5,000,000 barrels of oil have been taken out of the basin. That doesn't stack up with Texas production, but development in the Texas fields has been going on for over 50 years. And prospects in the Williston Basin are unusually good.

Ordinarily, oil companies figure that when they start sinking a well in a potentially potent area the odds for striking oil are only about one in eight. Strikes in the Williston Basin, however, have averaged better than one in two. Geologically, the

(Continued to page 264)

Revolutionary new heating system has individual control for each room

Outstanding comfort and economy. Same steam supplies heat and operates turbine-driven room heater fans



Room heating unit is recessed into wall, with only grille projecting. Can be painted to fit any color scheme. Above illustration shows 12,000 Btu unit.

Accurate control of temperature in *each individual room* has long been the goal of heating engineers. Now, with the Iron Fireman SelecTemp system, this is not only possible, but practical and economical. SelecTemp is a unique development in heating, now being enjoyed by thousands of people. Here are a few of the many SelecTemp advantages:

Thermostat in each room. Temperature of every room (including bathrooms) can be varied to fit the preferences of the occupants—and without affecting heat in other rooms. Desired warmth is maintained regardless of changes in outdoor temperature, wind direction or velocity, or of heat from sun or fireplace.

Continuous modulated heat. Each room unit automatically modulates its heat output, ranging from 100% down to 5% of capacity, maintaining a *continuous* flow of filtered warm air. Underheating and overheating, associated with "on-and-off" systems, are eliminated.

Low initial cost. No other system can be so easily and economically installed in new or existing homes or buildings. Costs no more than many systems with only one thermostat for entire house. Small flexible copper tubing (1/4 inch nominal I.D.) carries steam to each room unit. Return lines are 1/2 inch I.D. tubing. Unlike "hard" piping, long lengths of copper tubing, easily bent by hand, are snaked into the walls and around obstructions as readily as electric wiring, with a minimum of cutting and fitting. No electric wiring required for thermostats or fans.

Economical operation. Accurate heat control prevents fuel-wasting overheating. *Unnecessary* heating is eliminated. Rooms temporarily unused can be kept cool, but warmed again very quickly, at any time. Each unit automatically regulates its heat output to compensate for warmth from the sun, fireplace or cooking range.

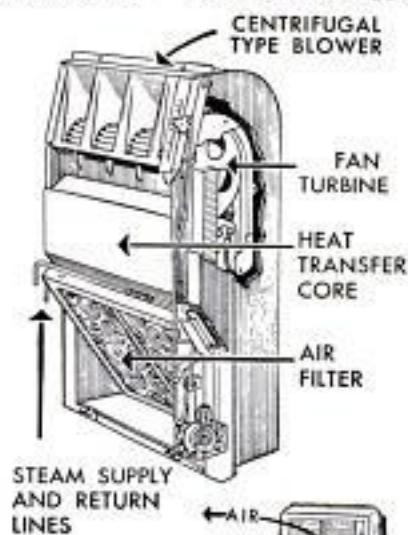
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heat transfer core, spun glass air filter, and quiet aluminum circulating fan, powered by steam turbine. Turbine rotor and fans are mounted on the same stainless steel shaft, which turns on self-aligning Graphitar bearings, requiring no lubrication. Filtered air is continuously circulated, with both air volume and temperature automatically varied according to room needs.

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basin is pretty much the same as oil-saturated Texas or Oklahoma.

"It will take many years and many more wells to explore adequately this tremendous territory," said John E. Swearingen, Standard's general manager of production. "The industry has only begun to scratch the surface."

Actually, the 50-odd oil companies operating in the basin still have several million dollars to go before they get their investments back. A major reason: Drilling in the United States' part of the basin has been deep, some wells going down almost 14,000 feet, which means an outlay of \$350,000 per well. Most wells—7000 to 10,000 feet—cost about \$150,000. In Canada, where oil is being struck around 3000 feet, the cost is only \$50,000.

The deep wells, however, are expected to pay off handsomely, and oil may soon be found in quantity at higher levels. Major oil companies are now pushing pipe-line construction to the big industrialized areas of the Midwest. Eventually it is expected that much of the oil will be used on the spot, giving rise to major centers of chemical and synthetic production.

More than 150 exploration crews are now working in the basin and drilling is going on continually. About 550 wells have been sunk in the United States portion of the basin to date. Of the 350 which have come alive with oil, about three fourths are in North Dakota and one fourth in Montana. Oil was also recently struck in the South Dakota section of the basin.

If you linger long in a basin oil town, you get more excited about possibilities than the natives. Matter of fact, most of the local people take the strikes calmly.

At Baker, Mont., another booming oil town, I talked with L. K. Lathrop, editor of the weekly *Fallon County Times*.

"Yes," he said, "they brought in another gusher on a farm near here yesterday. A few folk went out from town to have a look—but not many. Oil prospecting has been so good around here, it's almost bigger news when they hit a dry hole."

Leaving Baker and heading for Miles City, Mont., I noted beside Highway 10 a familiar cattle-branding scene.

I parked my car to watch. So did some people from Ohio. A woman got out and leaned over the barbed-wire fence.

"May we look?" she asked. "We've never seen branding except in the movies."

A cowboy stamped a hot Y Bar X brand on a calf and grinned:

"Sure, ma'am. Lookin' out here is free."
Oil indeed has changed the vast basin area, but not completely—yet. ★ ★ ★

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At Home, 2004 A.D.

(Continued from page 156)

result in three-level use of a lot—living below the surface, landing on it and doing most of our traveling above it."

Laszlo's theories are not to be taken lightly, because his background makes him highly qualified to forecast future trends. Born in Hungary, a member of a family of furniture manufacturers, he got an early start on a designing and decorating career. He opened his first office in Vienna in 1923 and, when he moved to Berlin shortly afterward, quickly established an enviable reputation as a creator of commercial buildings, residences, interiors and industrial products during the pre-Hitler period when Germany was a world center of modern architecture.

Emigrating to America in 1936, Laszlo continued to develop a design for living he had helped originate, one combining beauty, comfort and convenience, making use of relatively simple and inexpensive materials and expressing itself in one-story houses, informal plans and highly developed outdoor areas.

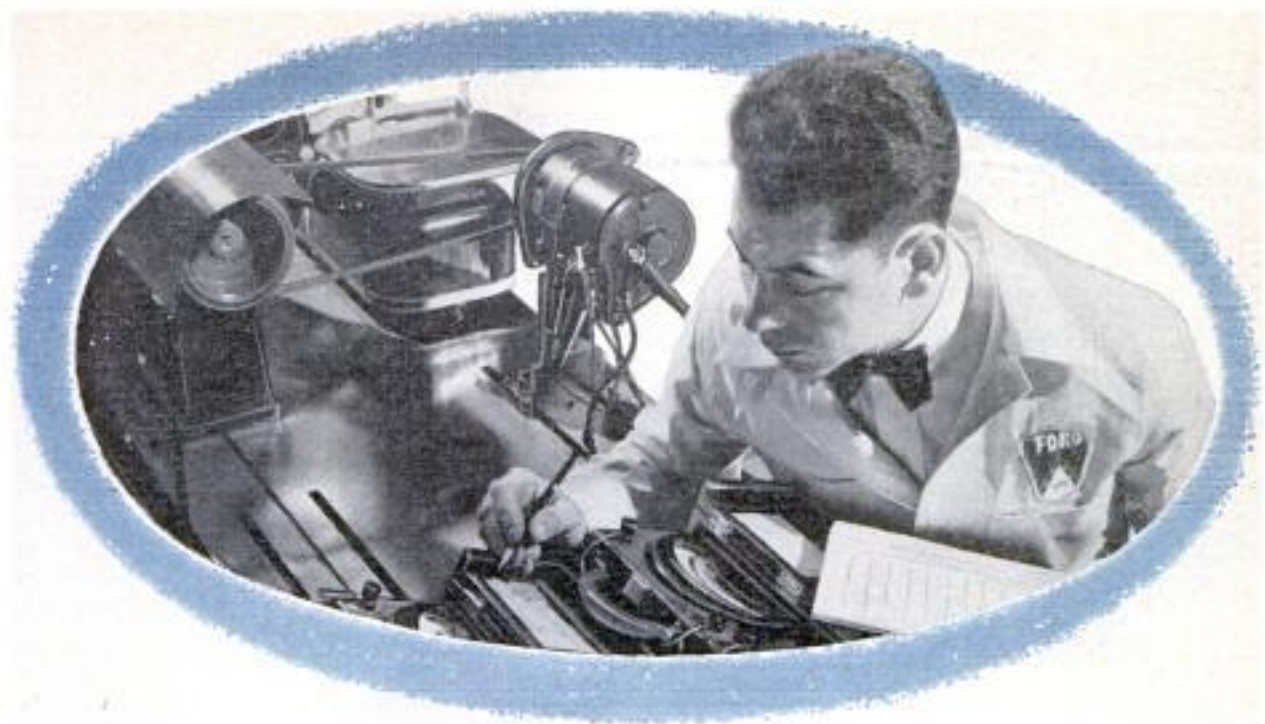
The majority of architects design homes as buildings—making the plans, outlining the details, getting a contractor to build them and leaving the interiors up to the owners. Laszlo does things differently. His houses are completely planned from construction site to lighting, furnishing, color and accessories, and he stays with each one until the last detail is completed.

He predicts that the highly organized society of his futuristic suburbia will prohibit individuality as far as selection of homesite is concerned, but that there will be much to compensate for this loss.

He sees the home of the future with a steel and concrete "mechanical core" roof, carrying a series of tubes to provide every possible utility, facility and service. This system will include telephone, water and sewer connections plus a supply of atomic energy for heating, lighting and power coming from a central source.

Concrete uprights are set around the Laszlo house of the future. The side walls are set at an angle and the interior is divided into two sections—one containing kitchen and dining facilities, the other bedrooms, baths and storage facilities. Between the two is a play area on the side near the main yard. Although maximum floor space will be fixed by the site, interior decoration will be individual except for some walls and service elements that will be prefabricated for economy. Individually designed partitions and furniture, as

(Continued to page 268)



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well as varied use of the overhead lighting and heating panel, will be matters of personal choice.

Automatic appliances plus advances in community child care will provide the housewife of the future with a great deal of spare time. Shopping will be simplified by selections being made from displays televised in color and 3-D. Deliveries will be made via a city-wide pneumatic tube system. Anything that can't be delivered or picked up pneumatically, such as clothing that has to be fitted or rugs and drapes that must be measured, will be handled through small stores on wheels.

Despite increased population, beaches will be less crowded than today. The bathroom as we know it will be a thing of the past, and bathing will have come out of the dark. Revived along ancient Roman lines, it will have become as refined and traditionalized as it is now in Finland and Japan. Americans in the atomic age will enjoy a bath in spacious, glass-enclosed areas open to the light, heat and health-giving rays of the sun, with adjacent outdoor pools.

Laszlo's home-of-the-future contains 1800 square feet. His house could be built today, exclusive of such innovations as atomic energy and pneumatic-tube connections, for about one third more than the cost of a conventional home. Fifty years from now it will cost much less.

"There's no doubt that prefabrication will become widely accepted," he asserts, "because it is the answer to the price problem. When building costs are high and attempts are made to build cheaply, the slums of the future are created. Today's big housing projects mark the beginning of a trend toward standardization which means steady progress in prefabrication. The privacy of a design such as mine eliminates one of the objectionable features of mass housing. Eventually, we'll have completely prefabricated communities."

Of course, Laszlo doesn't want to stick out his neck and say that he expects his forecast to bear fruit inside of 50 years, but there are good reasons to assume that it will. Those who regard it as fanciful should be reminded that 50 years ago much of what is commonplace today could be found only in science fiction. Certainly, scientific progress during the next half-century should be greatly accelerated by atomic research.

It's more than possible that Paul Laszlo's predictions are actually quite conservative, that they represent only a small part of what will have become reality by 2004. Science is now standing on the threshold of a new era. ★ ★ ★

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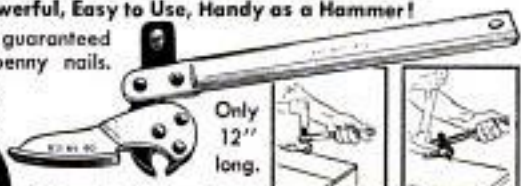
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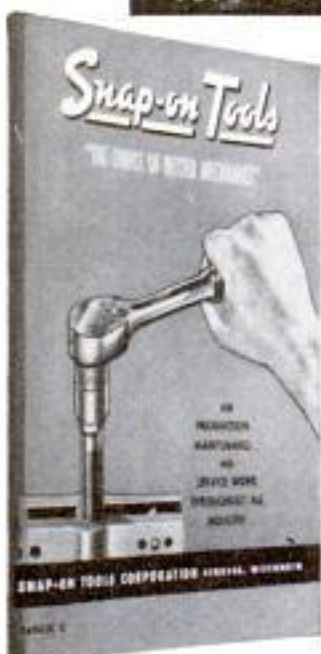


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**Is the Old Homestead
Worth Saving?**

(Continued from page 176)

peeling of paint on a frame house may mean that there is excessive condensation of moisture on the walls.

This leaves the roof as the main structural element now to be examined. Sight along the slope for obvious sagging. Look for deterioration of roof covering and metal flashing, gutters and downspouts.

Floor plan. The floor plan is important in an old house, not so much for what it is as for what it can be. In the typical house used as an example by Martling, the floor plan was promising. Although badly arranged before remodeling, it was adaptable to changes which did not involve extensive structural alterations.

Easy access from the front entrance was developed, so that the living room could be used as an entertainment area rather than as a mere corridor between sleeping and eating areas.

First-floor powder-room facilities were located to give maximum convenience and utility, yet complete privacy from the main sections of the house.

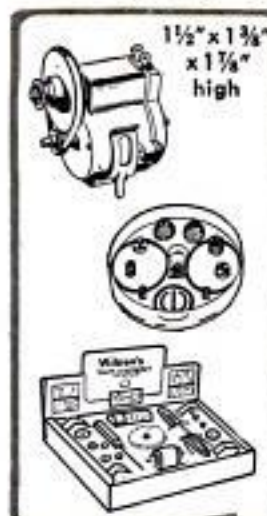
Before remodeling, this typical house had a porch which served no useful function other than as an observation post to study the comings and goings of neighbors and passers-by. A new screened-in porch was placed to give maximum enjoyment of the family's private garden.

Economics of the remodeling. There are two approaches to the problem of whether it is economical to remodel a home. If remodeling is being considered by the present owners they must compute the dollar expenditure as follows: To the initial cost of the house, add the remodeling cost. Then take into consideration the dollar value of the use already obtained from the investment. Weigh carefully the desirable factors of congenial neighbors and good location. Balance these against the cost of obtaining a similar new house. In many cases, where a family has lived in a home for many years, it has already paid for itself by providing economical shelter at a reasonable cost per annum. The additional cost of remodeling is, in this case, much less than the cost of buying a new home, and it is therefore more sensible to remodel than to start fresh.

In a case where a family is considering buying an old home and remodeling it, the same reasoning applies, except that the initial cost is apt to be higher and there is no offsetting figure for value received.

(Continued to page 272)

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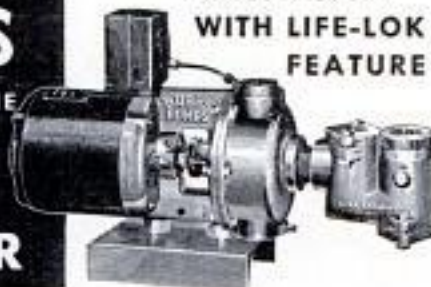
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Family needs and preferences. Just as in any planning, whether it is for a new or a remodeled house, the family needs must be analyzed.

Here are some of the points Martling considers in this phase of the planning: General standard of living, mode of living, work and play habits, age and family composition.

The growing scarcity of household help, the trend toward more home entertainment, the widespread preference for informal serving of meals all are having profound effects upon the architectural arrangements of new and rebuilt homes.

Esthetics of remodeling. The style of the remodeled home is influenced by several factors, Martling says. It may be possible to retain the same basic style, cleaning it up design-wise, and keeping costs to a minimum. It may be necessary to scrap the old style entirely, since many old houses have no particular design lines to follow. When this point is reached, it is wise then to consider family preferences. Do they have traditional furniture which is too good to be junked? Do they like only Early American furniture and architecture? Or do they admire sleek, contemporary lines? If their preferences run along the modern design line, does this style fit into the neighborhood?

Martling states that the test of a successful remodeling is this: Is it possible to determine where the new work starts and the old leaves off? The entire house should have a look of unity.

Another test for a good remodeling is: Will the style be as pleasing 10 or 15 years from now as it is at the present time?

Martling warned against fads in architecture. The efforts of a few years back to squeeze human beings into homes that were "machines for living" showed up in some cold and now-dated architecture. Enormous picture windows placed awkwardly, where they showed a view of nothing perhaps but the neighbor's picture window, porch or garbage cans, were a good example of such a fad. All-glass walls, all-in-line architecture, flat roofs and other trick devices may bring down the resale value of a remodeled home.

Martling also stressed the desirability of planning the remodeling as a whole, even if you intend to do only part of the work now. This may save you great expense at a later date when you might otherwise have to "alter alterations." Families sometimes try to skimp on construction in order to buy home furnishings. This may not be a wise decision. Over-all planning of the remodeling will help you to decide. ★ ★ ★

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they expected to build the house completely themselves; 22.7 percent said they would contract for the foundation, plumbing, heating and electrical work and would build the balance themselves; 21.6 percent said they would have a contractor build the shell and finish the interior themselves. This represents a total of 60.8 percent who would do all or part of the work themselves. The cost of materials for this house in the Chicago area (one of the highest-priced regions in the nation) is estimated at approximately \$9000. To have the house built by a contractor in the same area is estimated at \$23,350, not including lot.

Of course, the cost of the house will vary with local labor costs, the type of fixtures used, quality and prices of many materials and whether one-car garage or two. In the Long Island-New Jersey area the contractor's price for this same house is estimated at \$17,000. In some sections, particularly in the South, the house can no doubt be contracted for even less.

The Chicago-area cost figures are presented merely as a guide. In fixing the amount to be spent on the house, the architect and the editors of this magazine were influenced by the fact that the majority of those answering the survey indicated they would like to do some work on it themselves. For example, if a family can afford to spend \$12,000 and the materials cost \$9000 they would be able to spend \$3000 on outside labor and must do the balance of the work themselves. A reader of South Bend, Ind., wrote: "I would be able to invest around \$10,000 which I figure would be comparable to a house costing \$18,000 to \$20,000 built by a contractor." As revealed by the percentage chart, 39.2 percent would have the house completely built by a contractor. This, of course, would make it a much more expensive home.

The wall-to-wall closets and sliding doors reflect the wishes of many readers.

A man from Sundance, Wyo., wrote: "An attached garage should not open directly into the house, but should connect by a short, protected path outside." This demand was repeated by many others, including a man from Kirkland, Wash., who said: "The garage must be connected to the house by an overhead cover." Matern not only provided this in the plan, but a "rainy day" entrance to the porch from the front of the garage.

For every detail of this house, both architect and editors have been ruled by the results of the survey. Otherwise, what we have presented might have been an "architect's house" or an "editor's dream" instead of "the house you asked for."

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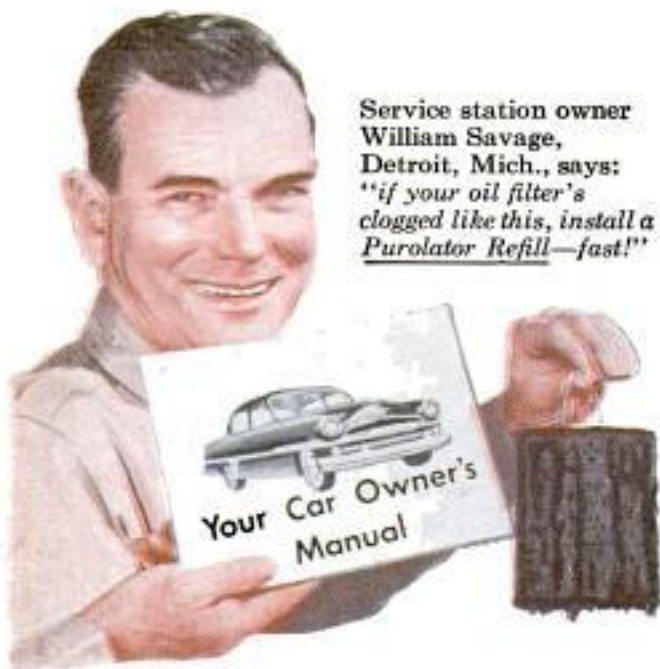


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Would You Build It Yourself Again?

(Continued from page 164)

on it was catch-as-catch can. I didn't stick to the plans. I put in two fireplaces that weren't there and consequently had to change the basement stairs. In fact, they're going to be a little steeper than normal. If it is possible to get plans that suit you, I'd say you should stick to them.

Q: How did you handle the foundation?

O'NEIL: We had the basement dug and did most of the rest ourselves. I have a friend who is a mason and he set all of my corners, two blocks high, for the concrete-block walls. From there on it was just a matter of filling in between the blocks he'd set and keeping them plumb all the way. My wife helped me in setting the blocks. In fact, she beat me. She set about 90 one day. She only weighs a hundred pounds and the blocks weigh 40 or 50 pounds. Here's a tip for two people laying block on the same job: It's better if one person lays an entire row.

SCHILDT: I was the laborer with my dad's help on the foundation. I had a fellow come in with a bulldozer and dig out the cellar. Unfortunately we hit rock. That was the first place where I should have deviated from my plans, but didn't, and it cost me an extra \$100 in blasting. My foundation footings went in very nicely. We mixed all our own concrete, rented a mixer for \$16 for six months. I did all my own cement work except the laying of the block. A friend of mine built a house and it took him three months to lay the block, doing it alone.

O'NEIL: Mine took approximately two months, for 1800 block.

LINDBLOM: I used a concrete-slab foundation. I rented a bulldozer for the excavating and used it myself. I raised the foundation grade about a foot at the low end for perfect drainage. My only cost was \$10 for using the machinery. After that I put in my own forms and had a cement contractor do the pouring. It took two men one day to pour the entire foundation. I used 24½ yards of ready-mixed concrete in the 24 by 40-foot slab.

O'NEIL: I would have been better off if I had had the basement done by a regular contractor.

LINDBLOM: I used three inches of crushed rock for good drainage and had a waterproofing compound added to the cement to keep the moisture from going through.

Q: How did you waterproof your basement walls?

SCHILDT: Stucco and mastic.

O'NEIL: I had mine done for only \$25.

(Continued to page 278)

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O'NEIL: I had a bad experience with my wall that anybody should guard against. It cracked. I think this was due to pressure from the floor joists because I put them in too tight. I had to use a hammer on some.

Q: How did you handle the framing?

O'NEIL: We had a set of plans with the framing all figured out, but decided we wanted the windows in different places. When we put them in we had to change all the studding positions. I'd advise anybody to follow his plans and not make changes like we did.

SCHILDT: Our house is two-story on one side with an exposed basement wall. I had to make sure my windows lined up with the ones below. They worked out fine. When I put the lath up for plastering, everything fit perfectly, very little patchwork. I did deviate from the plans on my room sizes. I made some mistakes when I drew the plans. I had my cellar stairs coming up the middle of the hallway—got a wrong measurement there someplace. I have a slight pitch on the roof, about four inches to the foot. Having my closets back to back and right down the center of the house, I had a perfect place to brace my ridgeboard by putting 2 by 4s straight down. I did not use trusses partly because I wanted to use the attic for storage space. We put in a folding stairway and have only a four-foot clearance in the attic.

LINDBLOM: I used roof trusses and cut all my material for them at one time. I timed myself in putting the trusses together on the floor. I found I could build one in 20 minutes after having the jig set up. I set them up on 16-inch centers.

Q: How about the sidewalls?

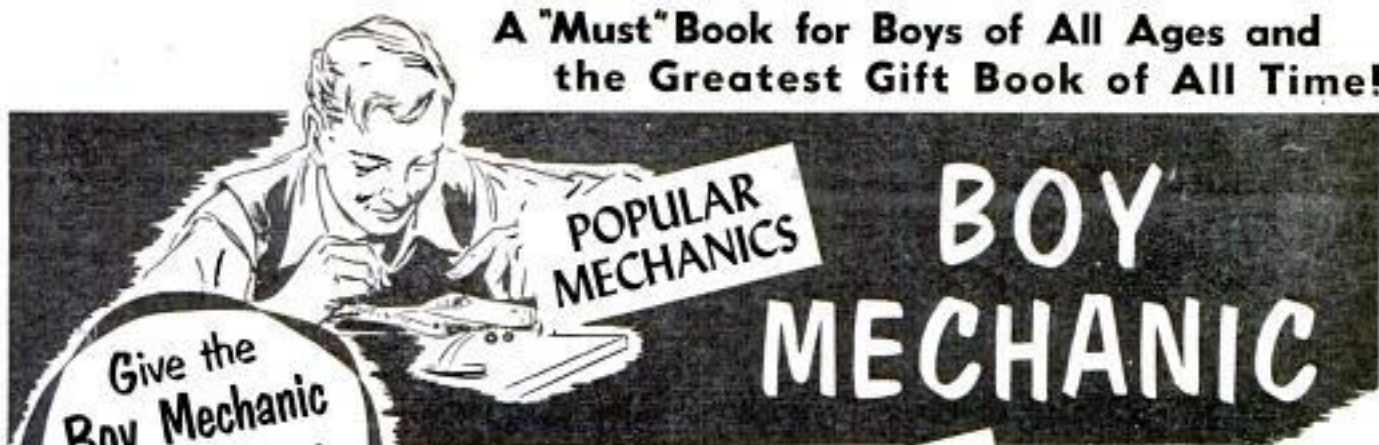
LINDBLOM: I built the studding on the concrete slab and raised it up. Worked wonderfully.

SCHILDT: I have a suggestion for home-builders. When you are putting up your studding, nail your sill down first, mark off your 16-inch centers all the way around your house, and lay your top plate right next to the sill. Mark off the same lines. Put an X on one side of the line so you know which side your studs are going to be standing on. Then nail them first to the single plate. Then nail the second plate and stand them up as complete units instead of doing as I started out, putting them in one at a time.

O'NEIL: Another important thing in laying your floor or ceiling joists is to have that crown, or warp, up. I didn't and had a lot of trouble.

(Continued to page 280)

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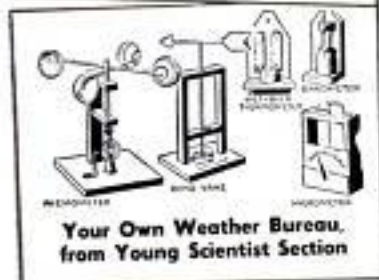
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Get Good Performance the Way Big Fleets Do...

Consolidated Freightways Uses Federal-Mogul Engine Bearings

Good engine performance is vital to the big truck fleets who move the nation's merchandise on its way to market.

Take a tip from the big fleets! For example, Consolidated Freightways, with headquarters in Portland, Oregon. They make wide use, in many of their engine applications, of Federal-Mogul oil-control bearings.

Federal-Mogul engine bearings can restore dependable engine performance for you, in your driving for business or pleasure. They have led in the replacement field for 30 years . . . because of quality! Ask your mechanic! FEDERAL-MOGUL SERVICE, Division Federal-Mogul Corporation, Detroit 13, Michigan.

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FEDERAL-MOGUL

Oil-Control Bearings

BEARING
MANUFACTURERS
TO THE
AUTOMOTIVE
INDUSTRY
SINCE 1899



Q: Any pointers on windows?

O'NEIL: I got mine pre-cut from a mail-order house.

SCHILDT: I made my awning-type windows at night in my dad's cellar.

LINDBLOM: I ordered my windows and door frames. Had a man come in and measure them. I put them in myself. My frames cost me \$150. Windows were another \$100.

Q: Did you lay up your own chimneys and fireplaces?

O'NEIL: I hired the dining-room fireplace built. For the living-room fireplace, I put the base in and ran the hearth two feet above the floor. Not knowing anything about brick work, I had a mason put in the firebox up through the throat to where the chimney started. I filled in around the outside with brick and put the chimney in all by myself.

SCHILDT: I also have two fireplaces. I put one in the basement myself, a Heatilator type. I had a mason do the one upstairs, also the chimney.

LINDBLOM: I had my fireplace installed by a contractor. It cost me \$350.

Q: What kind of siding did you use?

LINDBLOM: First, I inquired about the cost of redwood and found it would run me \$225 per thousand feet. This siding is cut diagonally out of a 2 by 12-inch piece of lumber. You get two pieces out of one. Then it is laid for overlap. That's what we used—redwood. A thousand feet did the house.

SCHILDT: I used a striated plywood that comes in sheets 4 by 12 feet. It is very reasonable in cost. Incidentally, when the lumberyard delivers any kind of lumber, lay it flat so it doesn't warp.

O'NEIL: Mr. Lindblom, did you stain your siding, or use some sort of protective coating?

LINDBLOM: I have two coats of boiled linseed oil on it, which I applied over a period of time. I gave it a good chance to dry in and six months later put on a coat of bear oil. It's like a varnish.

Q: How did you handle the insulation?

O'NEIL: We are using the batting-type insulation in the house, with the pellet type in the ceiling between the joists.

SCHILDT: I used four-inch batting in my walls, and loose rock wool in the attic.

LINDBLOM: I used the pellet type in the attic. It's easy to handle.

Q: How did you finish the interior walls?

LINDBLOM: I used plaster with the exception of where I have a birch-faced plywood wall between the kitchen and the living room.

SCHILDT: I had my house plastered. It cost \$2.30 a square yard.

LINDBLOM: How much for the job?

(Continued to page 346)



new, quiet **Evinrudes!** *smooth as sailing...*
horsepower with a **hush!**

A RIDE you will always remember—your first fabulous ride with a new *Whispering Power* Evinrude! So quiet . . . so blissfully quiet you hear the swish of the bow wave above the motor's hum!

But *quiet* is not all. You quickly sense that this ride is different from any before. There's a luxurious feeling of utter smoothness. Motor vibration and "boat shake" are magically gone! The wind in your face, the streaming wake, the whisking shoreline, all tell you you're going fast. But your ride is smooth as the

glide of a sailboat in a kindly breeze.

You will know that here, beyond question, is the *future* in boating fun . . . a new standard of performance that plainly charts outboard development for years to come. But all the wonderful pleasure of it can be yours *right now!*

SEE YOUR EVINRUDE DEALER—look for his name in the yellow pages of your phone book under "Outboard Motors." Choose from a complete range of 1955 models—3, 7½, 15 and 25 horsepower. The 25 HP Big Twin *Aquasonic* is offered in

both electric starting and standard models. Prices are no higher than you'd pay for ordinary motors. Time payments available. Your old motor brings top trade-in right now! For free catalog, write **EVINRUDE MOTORS**, Division of Outboard, Marine & Manufacturing Company, 4496 North 27th Street, Milwaukee 16, Wisconsin.

In Canada: Mfd. by Evinrude Motors, Peterborough.

Evinrude
quiet *Outboard Motors*



1

Replace thermostat every year for maximum heater efficiency and better cooling system performance. Quality built original equipment replacement. Rust-proof. Easy to install. Either Alcohol type or Permanent Anti-freeze type for all popular cars from.....\$1.28 to \$2.10



2

Wizard fuel pumps, guaranteed for long, dependable service. Original equipment replacement. Diecast body; precision machined surfaces and parts; fully tested for correct pressure. Diaphragm of extra high quality for longer life, top performance. For all popular cars (887291)\$1.75



3

"Minit-On" Tire Chains—so revolutionary you can put them on in just *one* minute. Install anywhere—in snow, on ice, or on a hill. Not "snap-ons", but complete, patented chains with adjusters. Tough, wear-resisting links. Plastic coat sleeve protectors included. Pair from \$13.95

New Power...New Beauty...

New Safety For Your Car At **Western Auto**

STORES AND ASSOCIATE STORES

NOTE: Western Auto Associate Dealers own their stores and set their own prices, terms and conditions. Prices may vary due to differences in local conditions. (PM 134)



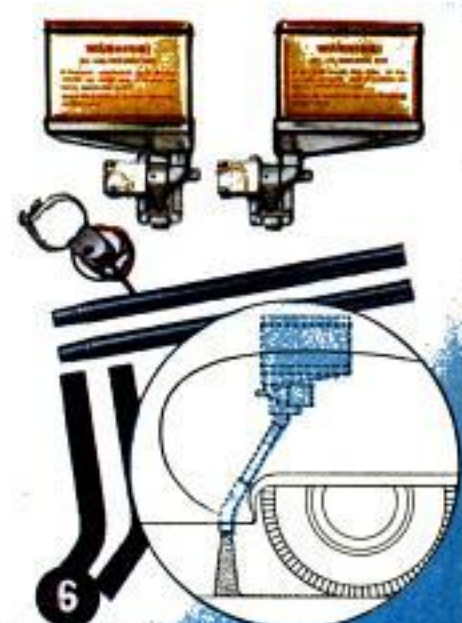
4

Don't be stranded by a worn-out fan belt. Replace now with a Western Auto extra-quality fan belt. Inner core of endless cable cords. Tough rubber cushion reduces heat, assures long life, cooler-running performance. Can't warp, slip, or stretch. Guaranteed fit. (789105).....98¢



5

Easy to change tires at night, spot street signs, house numbers with this all-purpose spotlight. Plugs into lighter socket, or dash socket which is included. Beautiful die-cast chrome-trimmed handle and rim with blue enamel back. On-off switch, GE bulb, 10' cord. 6-volt. (216116)\$5.19



6

"Grip King" Electric Road Sander mounts in car trunk. At touch of electronic control switch on the steering post, instantly discharges grit in front of rear wheels for non-slip starting, stopping on icy hills, packed snow, slick curves. Easy to install. Less grit. \$23.95 Non-freezing grit. 50 lbs. \$1.59

FREE: Mail post card today for folder explaining how to get more horsepower from your car. Write Western Auto, Dept. 2007, 2107 Grand, Kansas City, Mo.

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POPULAR MECHANICS DO-IT-YOURSELF WEEK SPECIAL SECTION

As the world's accepted source of do-it-yourself ideas for over a half century, it is appropriate for Popular Mechanics to join the many retail hardware and lumber dealers who are celebrating October 3rd through 9th as "Do It Yourself Week." Accordingly, Popular Mechanics presents this Special Section of do-it-yourself hints and projects plus the advertisements of many famous manufacturers of do-it-yourself tools and materials.

Do-It-Yourself . . .

"DO-IT-YOURSELF" is not a fad, as is sometimes suggested. Rather, it is the American way of life asserting itself, and actually stems from the founding days of this nation, when rich and poor alike were proud to do things for themselves.

It was not until after World War II that it became a byword and was recognized for what it is—a multibillion-dollar industry touching virtually every home in the land.

Continually rising tax and real-estate costs and labor shortages were contributing factors. The returning GI and his bride, seeking a home of their own, found their slender purse often insufficient to complete their dream house. Having purchased the basic structure, they had to maintain it themselves and do their own job of expanding, such as adding rooms in the attic or building a garage.

Businesses that for years catered to the professional artisan, suddenly discovered a great new market, and homeowners who had scarcely dared to touch hammer to nails, unexpectedly found they could paper their own walls or tile bathrooms with

products developed especially by these manufacturers for do-it-yourselfers.

In addition to saving money, men and women everywhere suddenly discovered they were having fun. They found a new friend and adviser in the friendly, helpful, hardware and lumber dealer.

For more than a half century, *Popular Mechanics*, the original do-it-yourself magazine, has published thousands of articles showing its readers how to do and make things themselves. It has served as an authority for the professional. It has helped the amateur approach professional status. It has offered advice and counsel to the hobbyist and home craftsman, who is now engulfed in the inclusive title of "Do-It-Yourself."

This month hardware stores and lumberyards are promoting the do-it-yourself movement with an organized campaign. We congratulate them and suggest that our do-it-yourself readers, and those who have not yet experienced the pleasure and economy of doing things themselves, consult these merchants.

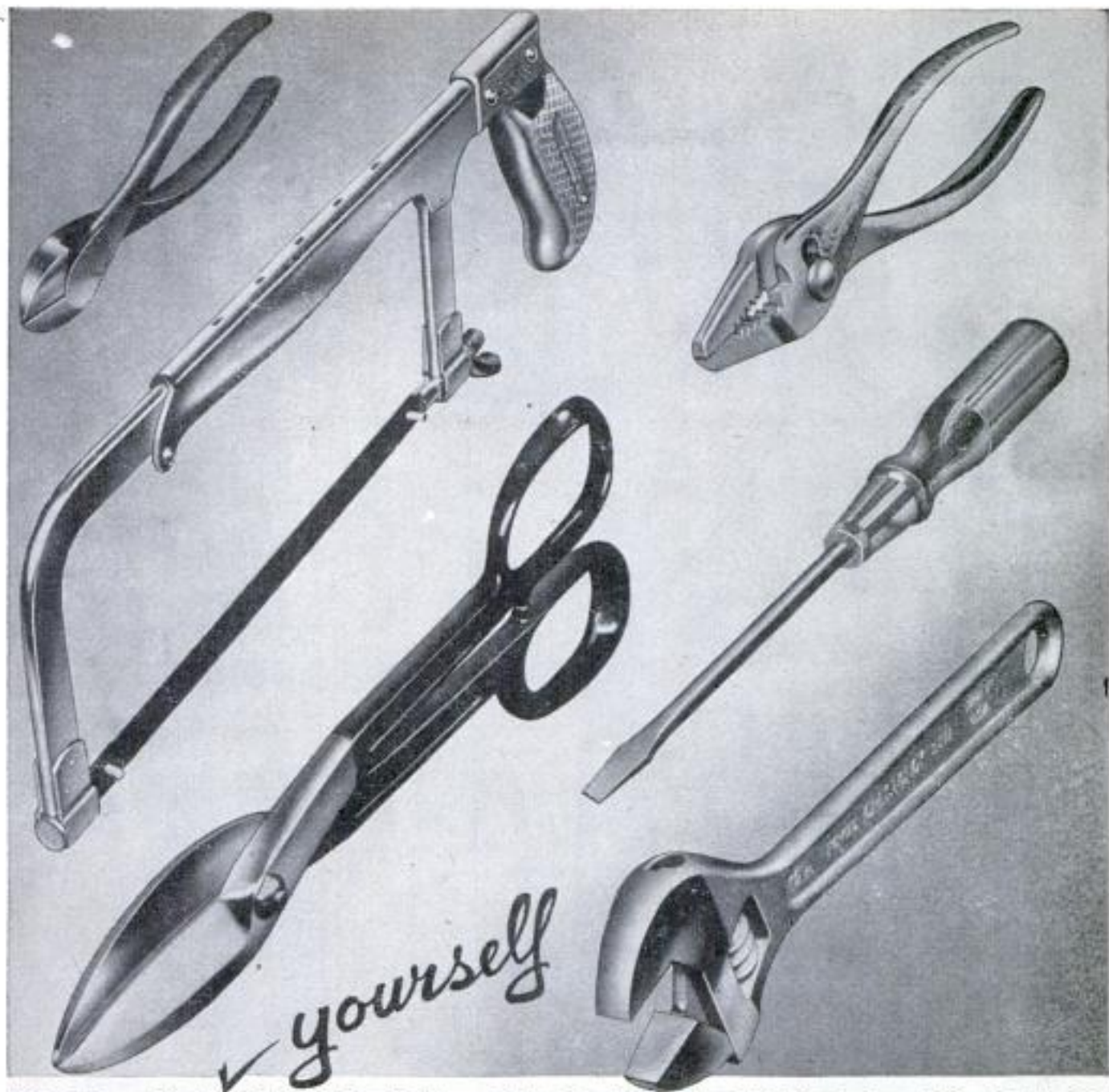
New
Porter-Cable
Homemaster
1/4" Drill

Now, just in time for Christmas, a new Porter-Cable 1/4" drill . . . plus a complete 12 piece drill accessory set . . . all for the special introductory price of only \$29.95.

Show this ad to your wife. Or buy one as a gift for yourself. You can't miss. New Homemaster Drill stands way out in front both in features and value: Gear chuck, trigger switch, ball bearing on spindle, polished finish, 2 amp. motor. Kit includes rough sanding and finish sanding discs, polisher-buffer, back-up pad and attachment, three twist drills, 1/4", 3/8", 1/2", polished metal carrying case, etc. See your dealer or drop postcard for name of nearest Porter-Cable Homemaster Store. Porter-Cable Machine Co., 2450 N. Salina St., Syracuse 8, N. Y.

Plus
12 Piece Accessory Kit
in Special
INTRODUCTORY OFFER
Special
Combination
Price **29.95**
Drill Alone **24.95**
12 piece kit
included in
introductory
offer, . . . **ONLY 5.00**

POPULAR MECHANICS



DO IT WITH CRESCENT TOOLS

Good Tools help get the job done quicker and better whether in the hands of amateur or professional mechanic. Crescent has been making nothing but fine Tools for nearly half a century. For well-balanced, easy-working tools that last longer and perform better, insist on CRESCENT or CRESTOLOY.

Sold by Hardware Dealers and Industrial Distributors everywhere.

CRESCENT TOOLS

Give Wings to Work

*Sign of the Artisan
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®

Crescent is our trade-mark, registered in the United States and abroad, for wrenches and other tools. Sold by leading distributors and retailers everywhere and made only by
CRESCENT TOOL COMPANY, JAMESTOWN, NEW YORK

for the first time
a modern power tool
 as simple to run as a
modern appliance

It's

TAKE IT



- ★ **NO MOTOR TO BUY!**
- ★ **NO V-BELTS TO BUY!**
- ★ **NO PULLEYS TO BUY!**
- ★ **NO POWER LOSS!**

What rugged construction!

As simple to run as a toaster!

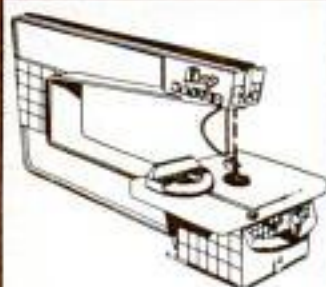
Can be kept in a closet!

Look at the big Control Panel that's so easy to see!

An Amazing Value at Only . . .

\$99⁵⁰

OTHER FAMOUS SHOPMASTER TOOLS



20" JIG SAW Built-in motor. Blade turns to rip. **\$45.95**



12" DRILL PRESS BENCH model Jacobs Chucks. **\$52.50**



10" TILTING TABLE BAND SAW Aluminum alloy. **\$52.50**



6" JOINTER-PLANER Cuts 1/2" deep and 6" wide. **\$89.95**

Complete!

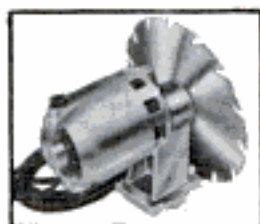
HOME JUST PLUG IT IN!

IT'S THE REVOLUTIONARY NEW

Shopmaster

FLOOR MODEL 8" CIRCLE SAW with BUILT-IN-MOTOR, table extensions

Now for the first time a power tool that is as simple to run as a modern appliance. You just plug it in! No motors to buy or mount! No V-belts or pulleys to worry about. Just bring it home, and plug it in! Now, the most important tool for your home workshop is also the easiest to operate. Shopmaster's handy floor model 8 inch tilting arbor Circle Saw features a



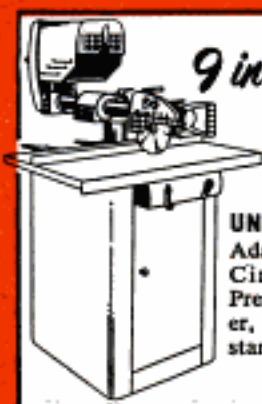
BUILT-IN-MOTOR

one-piece all-metal stand; has a specially-built nationally famous motor that develops up to $\frac{3}{4}$ horse power torque—direct drive motor . . . Operates with no power loss! Note the newly designed master view indicator with the finger-tip control. Blade cuts $2\frac{1}{2}$ " depth and tilts to a full 45 degrees. Table size with extensions is 16"x30". Comes complete with stand, saw, built-in motor, cord, mitre gauge, stop rods, rip fence, 8" Roc-edge blade, side extensions and plastic guard—nothing else to buy! All for only \$99.50.

MAIL TODAY



COMBINATION BELT AND DISC SANDER \$55.50



9 in one tool

UNIVERSAL TOOL
Adapts quickly to Circle Saw, Drill Press, Sander, Shaper, Router. Includes stand. **\$267.50**

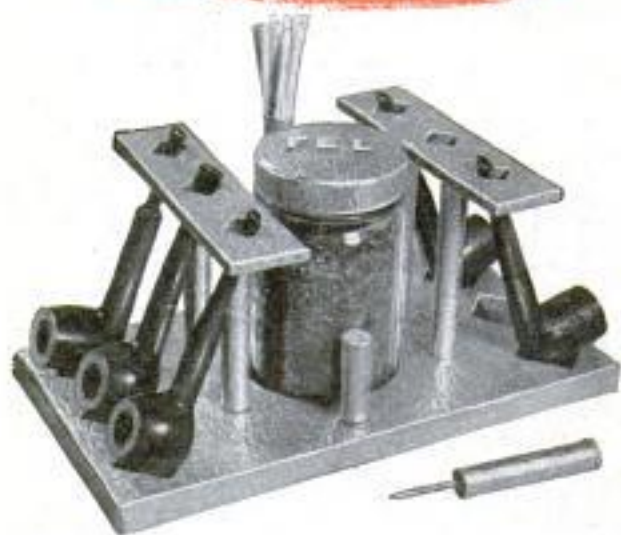


Shopmaster Rm. 10P
1214 S. 3rd St., Minneapolis, Minn.

Please send me complete information about the New Shopmaster Circle Saw.

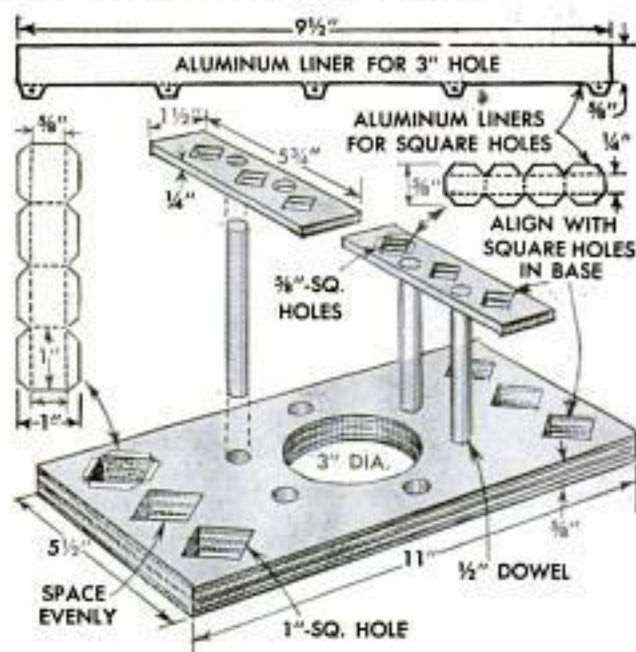
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Address _____
City _____ State _____

Aluminum-Veneered PIPE RACK



THIS ATTRACTIVE pipe-rack-and-humidor set is covered with embossed aluminum and includes a holder for pipe cleaners and a pick for removing dozzle. The wooden base and upper brackets are cut and drilled to the dimensions given in the detail, then covered with sheet aluminum which is

folded under and bradded to the bottom. Felt is cemented to the bottom of the base. The aluminum-covered $\frac{1}{2}$ -in. dowels which support the brackets were $2\frac{3}{4}$ in. long on the original rack. The dozzle pick is a sharpened nail driven into a dowel. The pick holder is a short length of dowel glued to the base. An aluminum tube, $\frac{1}{2}$ in. in diameter, holds the pipe cleaners. The humidor is a glass mayonnaise jar.



NEW Porter-Cable Homemaster 3" Belt Sander

Now the EASY WAY to Sand Do-It-Yourself Jobs!

Multi-use tool makes an expert
out of an amateur. A wonderful
Christmas gift for only

59.⁵⁰

● Specially designed by experts in the belt-sander field, the Homemaster brings to the Do-It-Yourself user all the know-how and exacting standards of Porter-Cable manufacture . . . at the lowest price ever offered on a tool of this quality. Full 3" width; a faster, easier-to-use tool that's almost fool proof in the hands of the non-professional. Sands, finishes with smooth, straight-grain cuts. No swirls, no gouges. Belts for wood, compositions, metal, ceramics, glass. Excellent for vertical and overhead work.

● See your dealer or drop postcard for name of nearest Homemaster retail store. Porter-Cable Machine Co., 2870 N. Salina St., Syracuse 8, N. Y.



- * Takes off paint, re-surfaces furniture.
- * Fits windows, screens, doors.
- * Removes stock easily as a plane.



Here's a tape that will hold it!

NEW Behr-cat® STRAP TAPE



A 180 lb. pull can't break this super-strong, glass-fibre reinforced tape. Proven by industry, it's now available for household use for countless taping jobs where strength is a must. It's pressure sensitive for quick, sure stick, too. Ask your Hardware Dealer for BEHR-CAT® Strap Tape.



Strong BEHR-CAT Strap Tape stops tools from rattling in car trunk.



Safe arrival is assured when Strap Tape is used to seal packages.



GET FINER FINISHES WITH BEHR-MANNING® GARNET PAPER

The professional cabinet makers' favorite for hand sanding. Outlasts ordinary sandpaper and produces superior finishes too. Send 10c for "SANDPAPER — How to Choose and Use."



KEEP TOOL EDGES SHARP WITH AN INDIA® BENCH STONE

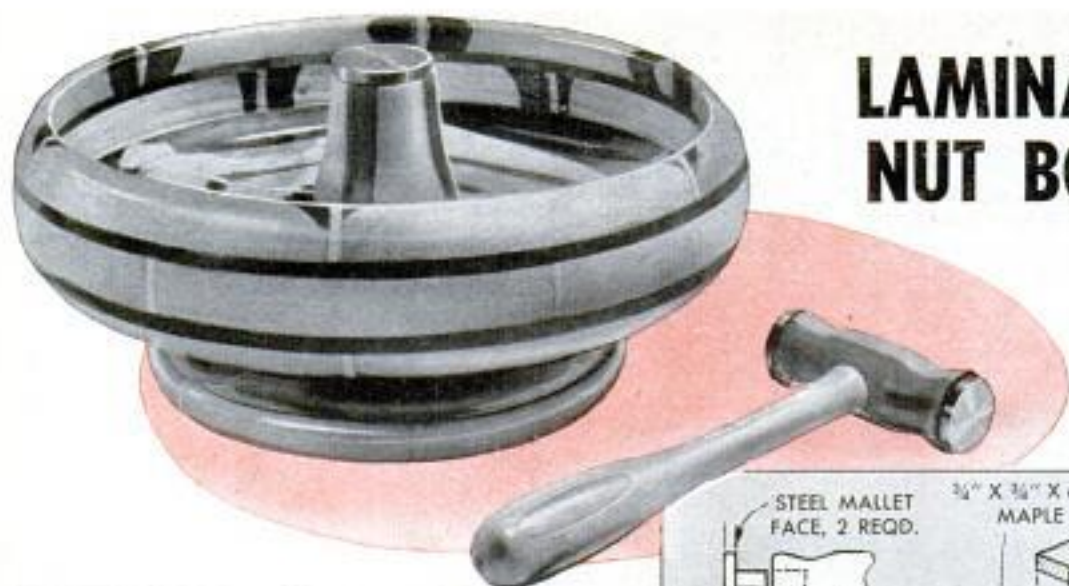
Pre-filled with oil to resist clogging and produce factory-sharp edges in quick time. Send 10c for the famous "How to Sharpen" Book. Behr-Manning, Troy, N. Y., Dept. PM-10.



BEHR-MANNING
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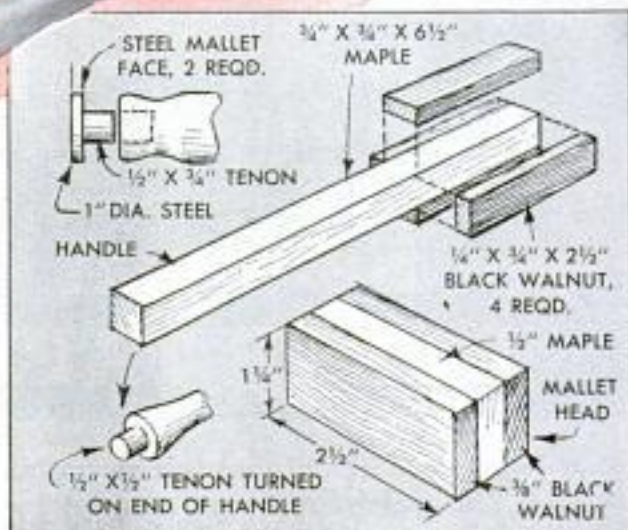
▲ COATED ABRASIVES
▲ SHARPENING STONES
▲ PRESSURE-SENSITIVE TAPES

LAMINATED NUT BOWL



FUNCTIONAL and attractive, this nut bowl is turned from stock laminated of alternating dark and light woods. The stock is cut into 60-deg. segments and 18 pieces are spaced with $\frac{1}{8}$ -in. strips to form three hexagons. The 6 $\frac{1}{2}$ -in.-dia. base is cut from the center of the first hexagon. Black-walnut strips and the anvil, shaped as indicated, complete the assembly. The mallet is built-up as indicated in the detail. Caps turned from 1-in.-dia. steel are fitted on the mallet and anvil.

(Continued to page 290)



Buy **EVANS** for
EXTRAS
in 6, 8, 10 and New 12 Foot
"WHITE-TAPES"



FREE WITH EVERY TAPE
— this sparkling crystal
Tenite utility case.

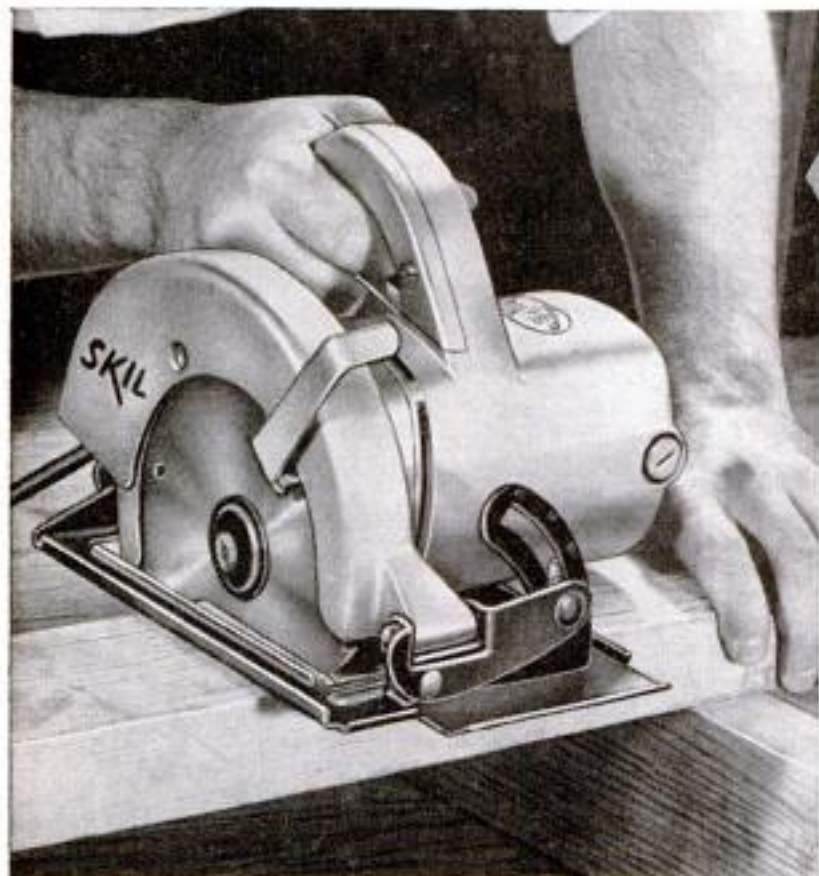
This is the BUY for your money — the original, reasonably priced "White-Tape" by EVANS. Your measuring tape dollar goes further! Chrome plated, sturdy case. Snow-white Bonderized steel blades with jet markings, easy to read, last longer. Velvet push-pull action. Instant change replacement blades available. 12-foot size, made *only* by EVANS, has convenient new blade markings in feet and inches as well as regulation inches.

Evans & CO. 410 Trumbull St., Elizabeth, N. J.

EVANS
L-O-N-G "WHITE-TAPES"
25-50-75-100 Ft. Lengths. Sensibly priced from \$3.49. In transparent utility box. Leather grained vinyl cover. Hook ring attachment no extra charge.
Sold Only Through Retailers

EVANS, THE LARGEST PRODUCERS OF STEEL TAPES WORLD-OVER

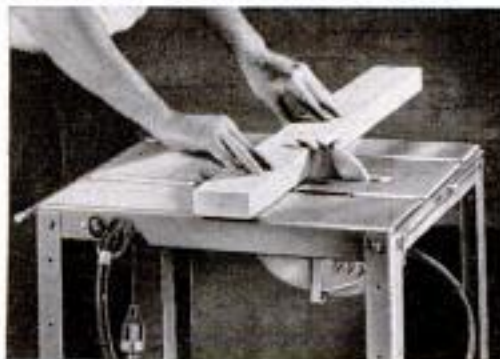
Compare the New **SKIL** Saw Value with any other...



**Only \$39.95 more . . . Converts
SKIL Saw to all-around combination tool**

It's another SKIL "scoop"!

This sturdy SKIL table makes your portable SKIL Saw an accurate, tilting arbor bench saw. Combination meets all sawing needs . . . Portable saw for building or remodeling jobs—plus a bench saw for precision furniture or cabinet work. SKIL Saw Table Combination, only \$89.45.



SKIL Home Shop 1/4" Drill
\$24.95 with hex-key chuck
\$26.95 with geared chuck



SKIL Home Shop Bell
Sander 2 1/4" . . . \$79.50



SKIL Home Shop 6"
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Made only by SKIL Corporation, formerly SKILSAW, Inc., 5033 Elston Ave., Chicago 30, Ill. • In Canada: SKILTOOLS, Ltd., Toronto 9 • Factory Branches in All Leading Cities

at only
\$49⁵⁰

Here's why it's your best buy

For building, remodeling, repairing, or just making things, the new SKIL Saw is designed for you! Only SKIL "know how" could produce this value leader. From blade to handle it's everything that has made SKIL the outstanding name in portable saws.

That's why we say, "Compare the new SKIL Saw Value—with any other, at any price—before you spend a cent!" Compare the features, the balance, the workmanship, sturdiness, power and versatility! Then remember—that the name "SKIL" on any power tool means it's the best money can buy. Only SKIL—the leader—can dare to ask you to compare!

**Compare these Features!
No other saw at this price
can match them!**

Oversize Motor . . . Ball and Anti-Friction Bearings . . . Built-In-Bevel and Depth Adjustment . . . Telescopic Safety Guard . . . Trigger-Type Switch . . . Sturdy, Die Cast Aluminum Housing . . . and many other SKIL-made "firsts."

SKIL
HOME SHOP TOOLS

SKIL Home Shop and Builder's Saws available in 6", 7 1/4", 8 1/4" blade sizes. There are more than 22 SKIL Home Shop Tools to speed work, save time and money for home-owners.

MORE SANDING AREA

than any sander in
its price class

25 square
inches



only **2 5/16"** high...
fits under tight places

LOWEST SANDER DESIGN



The Newest Power Sander and Polisher on the Market

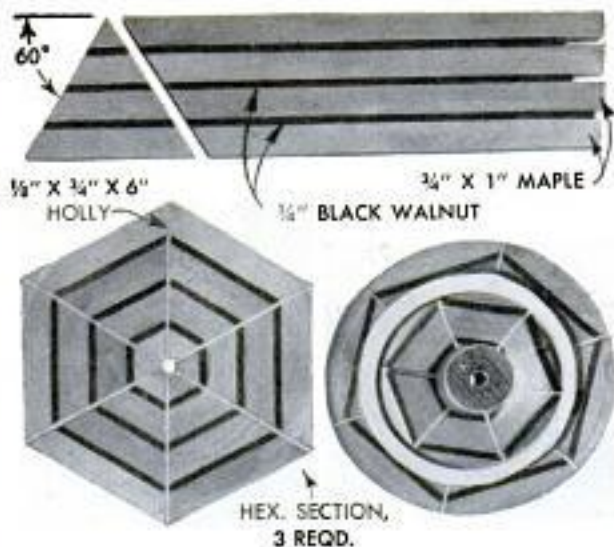
As efficient as any rotating motor-driven sander, plus these quality features: straight-line action, no bucking, sands *with* the grain and goes all the way into corners; powerful 60 cycle reciprocating motor gives 14,400 strokes per minute; exclusive insulation gives smooth, quiet operation; push-button control; 8 foot cord.

Weller

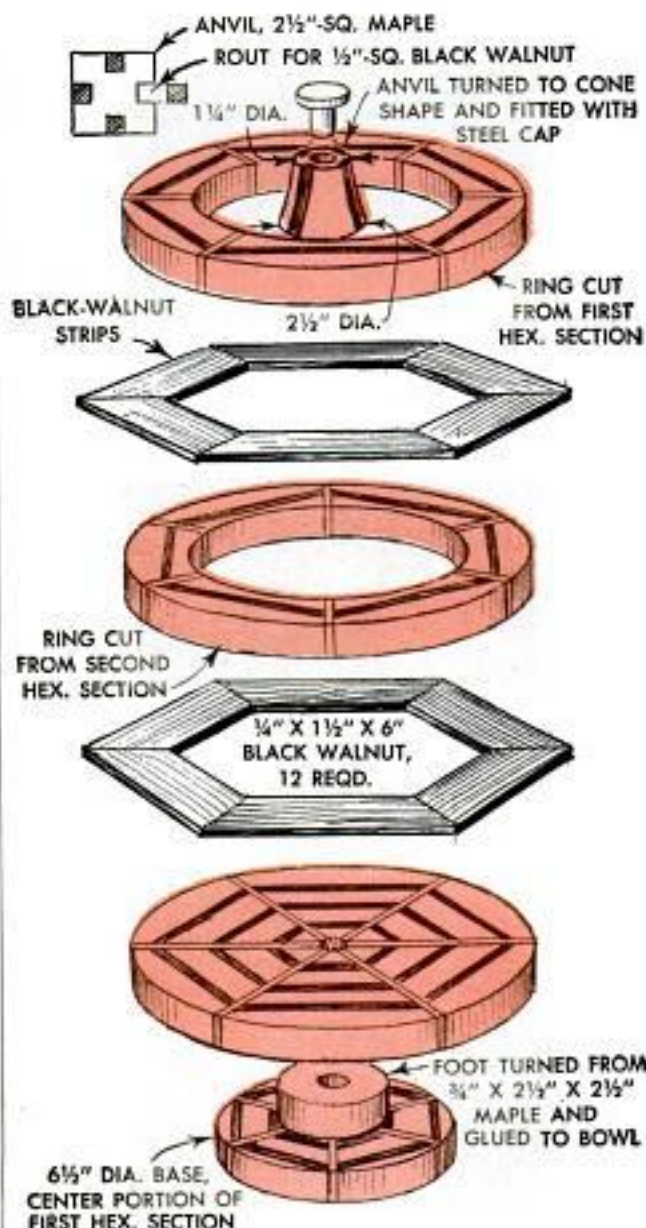
SANDERS

816 Packer Street
Easton, Pa.

AVAILABLE AT HARDWARE STORES



Above, stock from which bowl is assembled and turned is laminated from black walnut, maple and strips of holly. Below, exploded drawing shows relation of various parts and the method of assembly



POPULAR MECHANICS

The CHRISTMAS GIFT

that has everything any
homecraftsman or
hobbyist needs

FOR SCORES OF
MONEY-SAVING
JOBS

Perfect gift to give or receive . . .
useful all year 'round. Each kit includes:

- Weller 8250A Soldering Gun—
250 watts
- Famous Kester Solder—general
purpose spool
- Soldering Tip—for all kinds of
soldering
- Smoothing Tip—for mending
and sealing
- Cutting Tip—for plastic tile, etc.
- Wrench—for tip interchange
- Instruction Booklets—handy
soldering and homecraft hints
- Metal Case—for storage and carrying

Nothing else to buy for soldering, sealing, cutting, mending,
joining and smoothing. Makes professional results easy.

NEW WELLER GUNS AND KITS ARE AVAILABLE AT HARDWARE DEALERS

Junior SOLDERING GUN

- New, Compact Design
- Heats in 5 Seconds
- Over 100 Watts
- Trigger Switch Control
- Dual Spotlights

The ideal homecrafters' soldering tool.
No other soldering gun or iron offers the
professional quality, practical features and
low price of the Weller JUNIOR.

Weller

THE FINEST TOOLS FOR THE FINEST CRAFTSMEN
ELECTRIC CORPORATION
816 Packer St., Easton, Pa.

SOLDERING GUNS • SOLDERING KITS • POWER SANDERS

OCTOBER 1954

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only \$14.95

MODEL 8250AK

MODEL
8100

\$7.95

Build your own FIREPLACE INDOOR - OUTDOOR

FREE Booklet shows how



Booklet gives Complete instructions.

- Foundation
- Steel heat-circulating form
- Cold and warm air ducts
- Mantel or decorative front

Fireplace form set on foundation includes firebox, damper, down draft shelf and smoke dome.



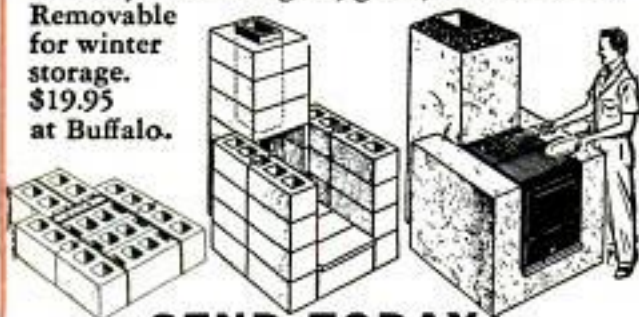
Brick, stone or cement block can be used around the form.



Save time, money and materials with PRICE steel fireplace forms.

Build this outdoor fireplace in ONE DAY!

• Use inexpensive concrete blocks with the Fyro-Grill steel form and complete the job in a day. Includes grill, grate, draft control. Removable for winter storage. \$19.95 at Buffalo.



SEND TODAY!

Please send —

- Directions for building heat-circulating fireplace, free.
- Book "100 Fireplace Ideas". Pocket size book, free.
- Larger book, 8½ x 11, beautifully illustrated, 25c.
- Build outdoor fireplace in 1 day. Also, 10 beautiful designs, free.

Name

Street

City

PRICE FORMS AVAILABLE FROM YOUR DEALER

PRICE FIREPLACE HEATER & TANK CORP.
204 W. Austin Street, Buffalo 7, New York

Hints for Using ELECTRIC HANDSAWS

PORTABLE ELECTRIC SAWS, when correctly operated, are versatile timesaving tools that can be used to make an infinite variety of cuts. Whenever possible, the saw should be used so the wide side of the base-



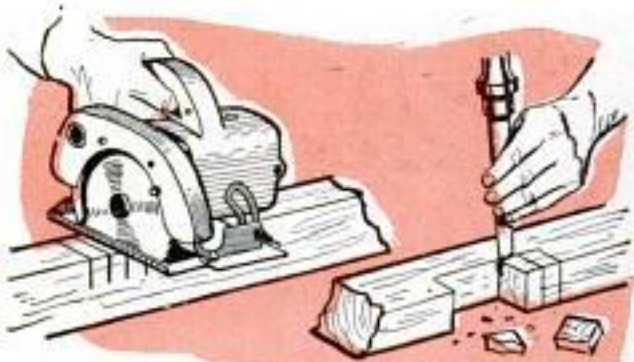
plate remains on solid wood, as in the upper drawing. The weight of the saw is supported and the blade is kept from binding. As shown in the center drawing, pocket cuts are made by pivoting the saw on the front edge of the baseplate. With

the blade set to cut to its maximum depth, the guard is held back and the saw is lowered until it cuts through the wood. It is pulled back a short distance to the nearest corner, then pushed forward as when ripping or crosscutting. **Caution:**



When operating the handsaw with the guard held back, as in pocket cutting, be extremely careful of the exposed blade. Notches are made by setting the saw blade to the desired depth and making a cut at each end of the notch. Then make

two or more cuts in between, as shown below. The waste is removed with a wood chisel and the bottom of the notch is smoothed with a wood rasp and file. Keep the saw blade sharp and properly set.



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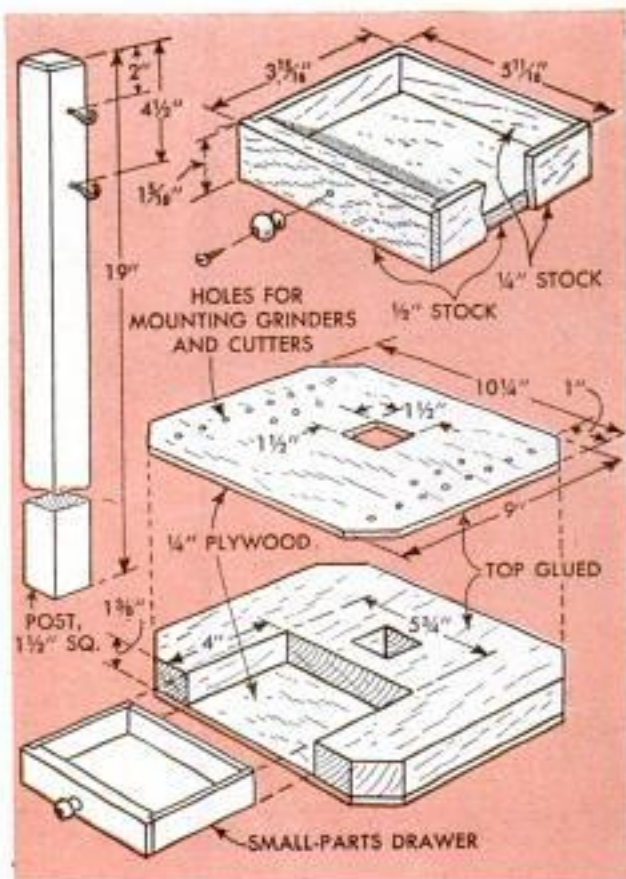
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KANKAKEE, ILL.

Handy Stand for FLEXIBLE SHAFT

By Dick Hutchinson

THIS EASILY MADE flexible-shaft stand brings the shaft, motor and accessories right to the work, eliminating the need for hanging the motor from a nail and carrying an extra box of grinders and cutters. The base of the stand is made of $1\frac{3}{8}$ -in. pine, covered top and bottom with $\frac{1}{4}$ -in. plywood. The pine center of the base is cut out for a small-parts drawer and also for a $1\frac{1}{2}$ -in.-sq. standard. The plywood top also is cut out for the standard. The drawer consists of a rabbeted front of $\frac{1}{2}$ -in. stock and $\frac{1}{4}$ -in. sides and back. These are nailed and glued to a $\frac{1}{2}$ -in. bottom panel. The standard is 19 in. high and glued in the hole in the base, two screw hooks being used to hang the motor and shaft.



POPULAR MECHANICS

Four types of Temlok insulation board and how to use them

It's easy to add extra living space to your home with Armstrong's line of Temlok insulating fiberboards. For interior use, there's Perforated Temlok Tile, an economical, sound-absorbing ceiling material; Temlok



- 1. TEMLOK PLANK** is a sturdy wood-fiber building material that can help you turn unused space into a cheerful room in just a few days. The special Lok-Bevel joint simplifies installation, assures a correct fit for each plank. Factory painted in a random-colored "Suntan Blend," Temlok Plank comes 8", 12", and 16" wide and 8' and 12' long.



- 3. PERFORATED TEMLOK TILE** is a noise-absorbing ceiling material that can add comfort and quiet to busy kitchens, playrooms, shops, and utility rooms. Installed over furring strips, Temlok Tile has a Lok-Bevel joint that hides nails and staples. Pre-painted tiles, plain or perforated, are 12" x 12" or 16" x 16".

Plank, a random-colored wall finish; and Temlok Board, in large, easy-to-handle sheets for ceilings, walls, and partitions. Temlok Sheathing, used on the outside walls, adds valuable strength and insulation.



- 2. TEMLOK BOARD** comes in large sheets that cover walls, ceilings, and partitions quickly. These big boards mean fast installation because they can be facenailed in place over studs or wood furring strips. Temlok's insulating value keeps heat inside in winter, outside in summer. Pre-painted in Light Ivory. Sizes: 1/2" and 3/8" thick, 4' wide and up to 12' long.



- 4. TEMLOK SHEATHING** nailed to the framework of an enclosed porch or addition adds extra strength and insulation. This sturdy building material is impregnated with asphalt and has a water repellent "Rain Shield" finish to keep your home weathertight all year round. Sizes: 2' x 8', 4' x 8', 4' x 9'.

For full details on Armstrong's Temlok see your lumber or building materials dealer. For your free copy of the booklet, "New Ways to Remodel Your Home," write Armstrong Cork Company, 3710 Watch Avenue, Lancaster, Pennsylvania.



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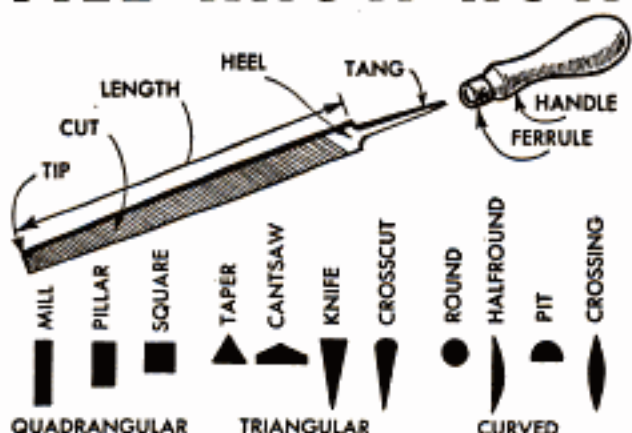
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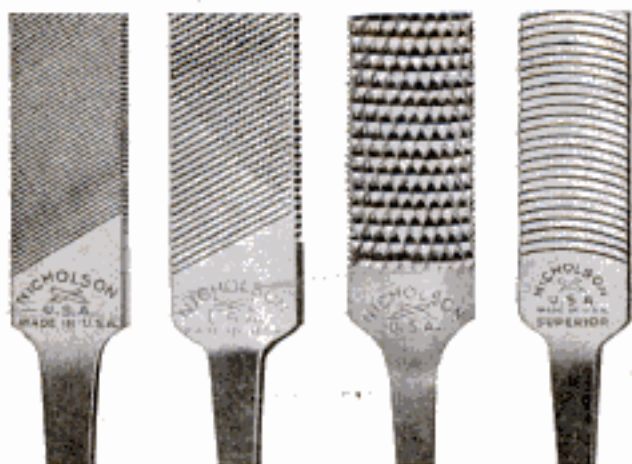
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FILE KNOW-HOW



SINCE A SELECTION of files is a must for every homeowner's tool kit, you should know something about the files available to make a wise selection. There are files of various shapes, types and cuts to suit any kind of work and for use on different materials. In the illustration above, the different shapes and types are silhouetted and named. The shape indicates at a glance the type of work a file will do. The teeth of a file may be single-cut, double-cut, rasp-type or curved, as shown in the photo below. Single-cut files are used chiefly for finishing work under light pressure. Double-cut files remove material faster, but require more pressure. Rasp teeth are a series of individual, disconnected teeth for extremely rough work, chiefly in wood, leather and soft metals. Files having curved teeth are single cut and are used mostly on soft metals. A sharp file cuts with very little downward pressure, although this varies with the depth of bite and the material being cut. But with a sharp file, practically no pressure is required for finishing cuts. Too much pressure dulls the teeth, and insufficient pressure, which allows teeth to slide over the work without cutting it, also tends to dull teeth. Files should be stored in moistureproof wrapping as rust destroys the sharp edges of the teeth.



MAKE A

Xmas Gift

FOR YOUR HOME

OUTDOORS—These gay holiday figures send an old-fashioned Christmas greeting from roof, porch or lawn. Build these 30" and 40" figures with minimum time and expense. Simply trace the full-size Easi-Bild* Pattern onto the material and cut out. Full instructions, and directions for decorating, are included with each pattern. The coupon below is your order form.

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INDOORS—The unusual valance-bookcase, shown at the right, frames your windows — offers ample space for books, record albums, etc. — conceals the curtain rod. This is only one of 18 practical make-it-at-home suggestions to be found in the three new Homasote "idea" folders. Plans for chests and cabinets, details for a room in the attic, warmer, quieter floors, or a waterproof cellar — all are to be found in these folders. To secure all 3 booklets — a valuable addition to your make-it-at-home file — kindly include 10¢ for handling costs.



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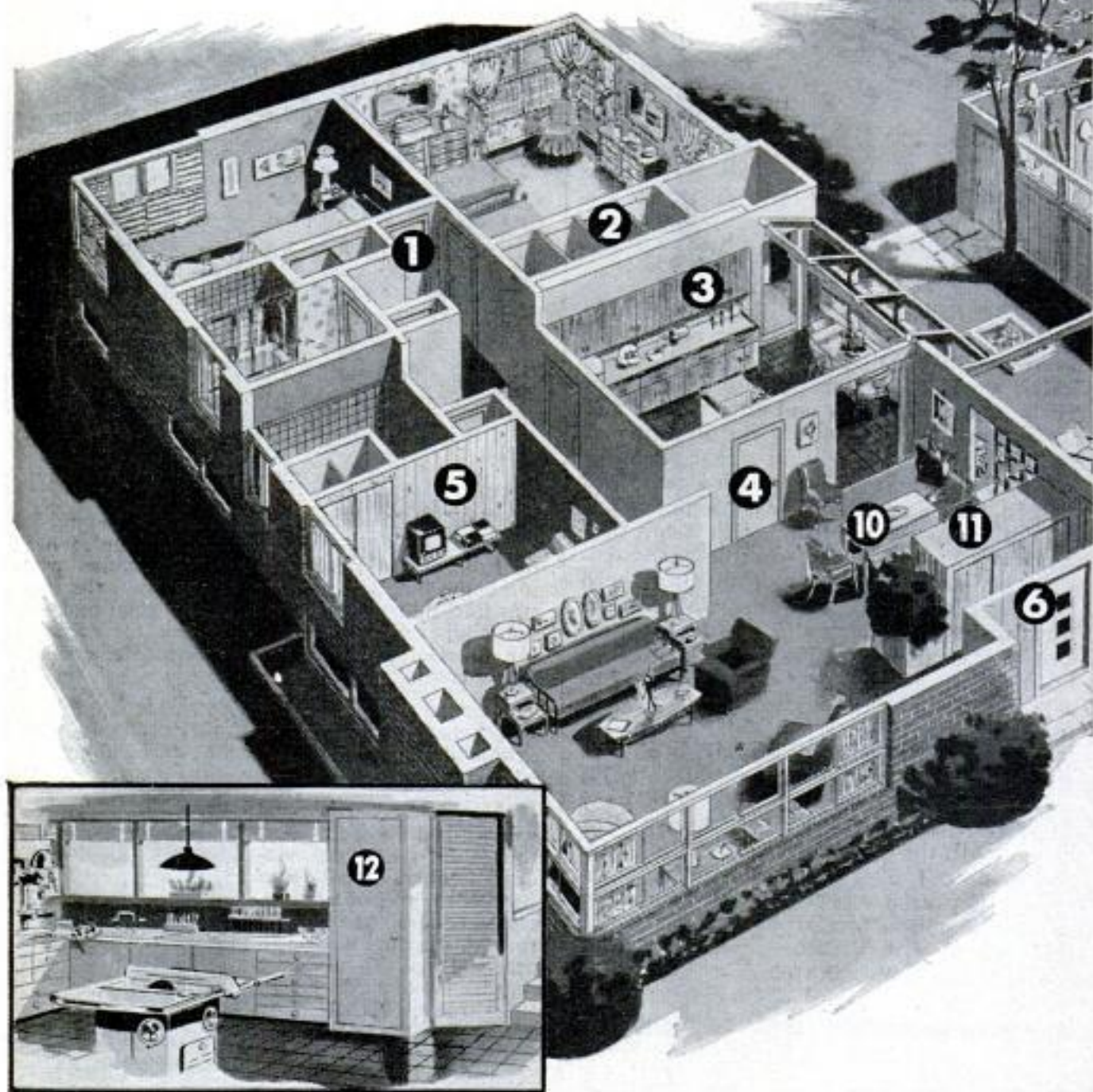
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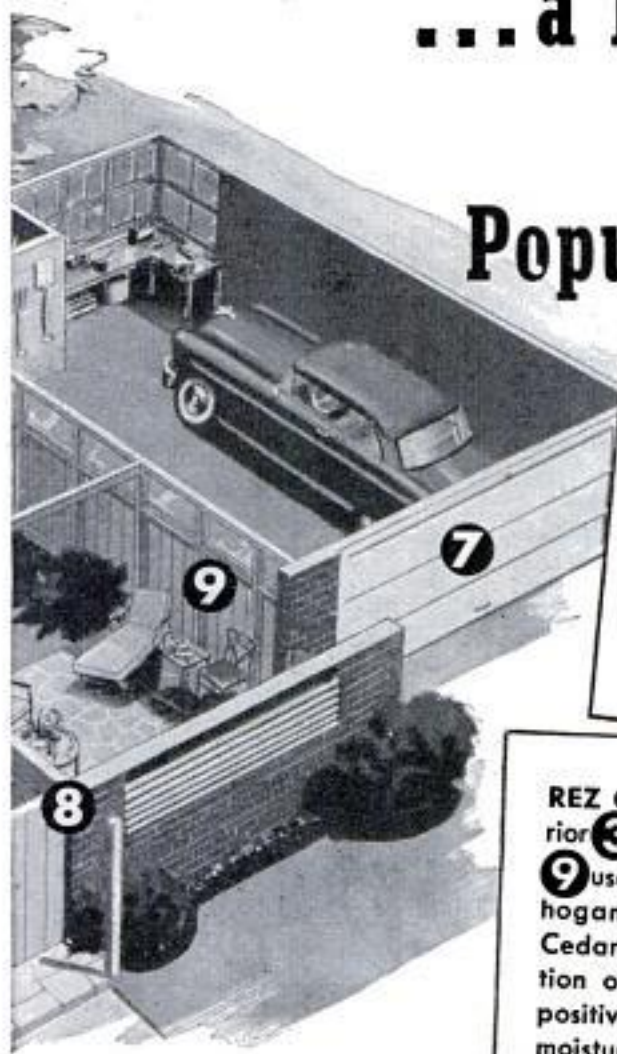
Rez Penetrates the Pores of the Wood. Rez does more than just coat the surface. Rez *bonds* with wood, sinks deep into the pores, brings out *full* color and natural beauty, gives you a uniformly smooth surface.

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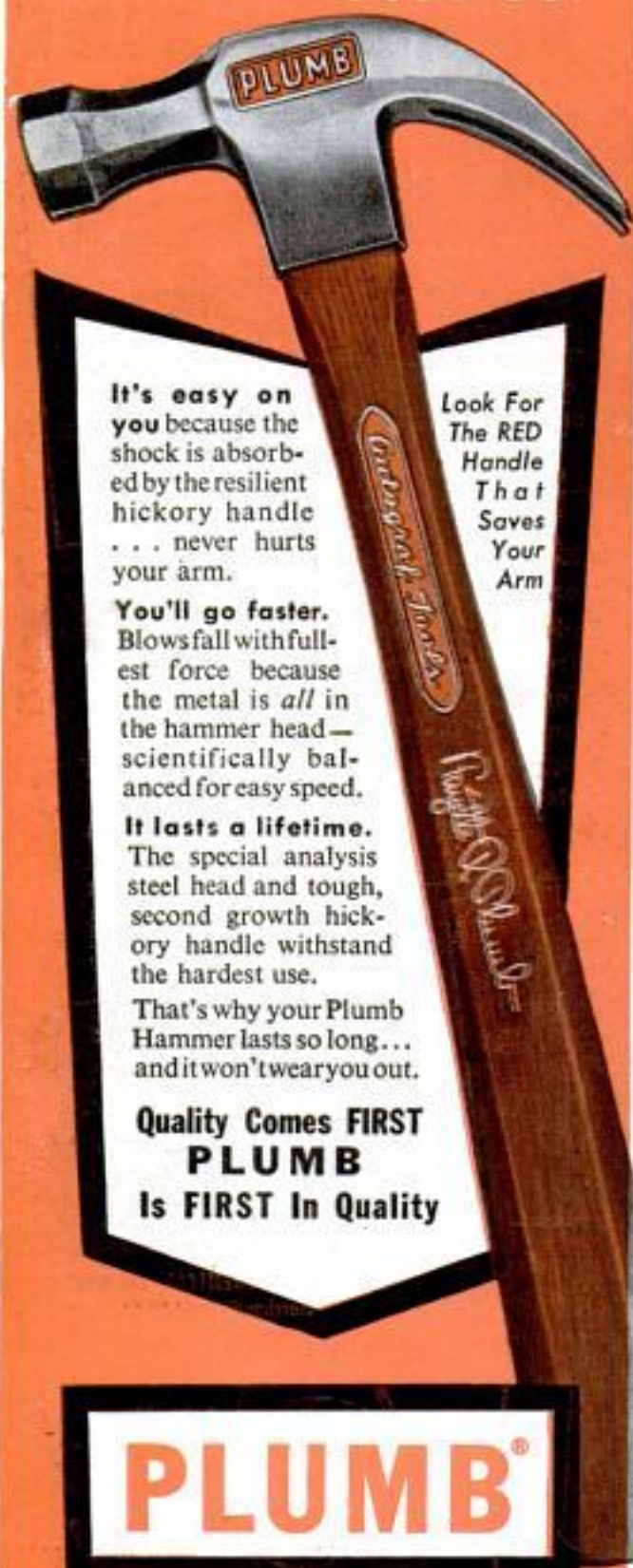


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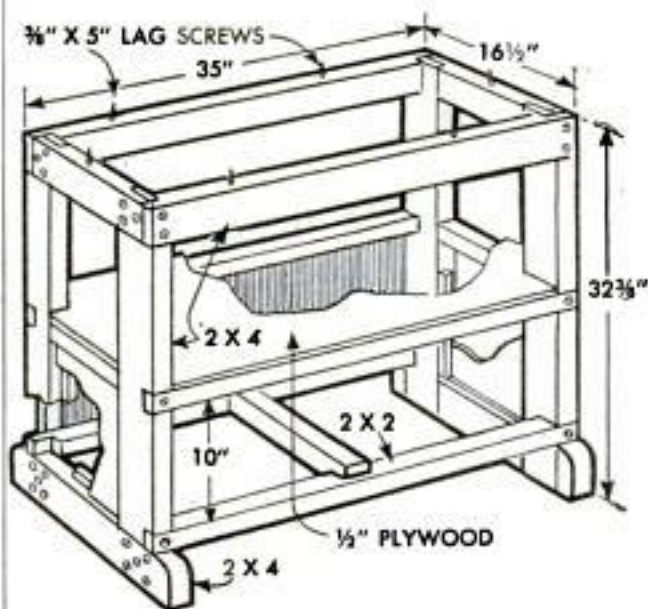
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(Continued to page 302)



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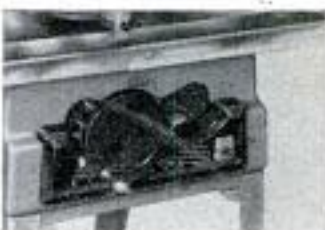
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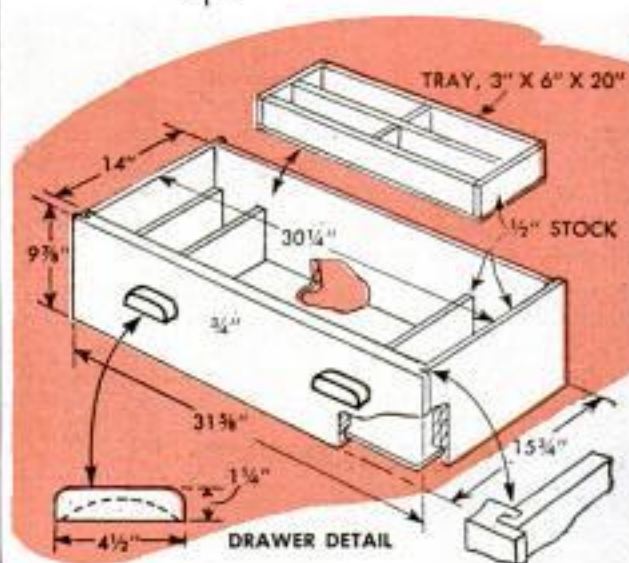
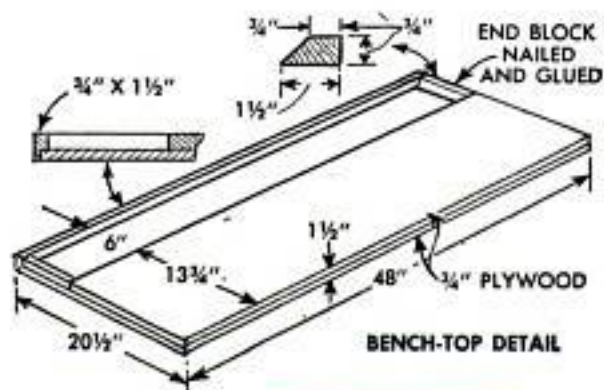
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appearance with maximum strength. Note in the detail that the corner posts extend all the way from the bench top to floor. The shelf is of $\frac{1}{2}$ -in. plywood notched to fit around the posts, while the end panels are of $\frac{1}{4}$ -in. plywood or hardboard. The latter are nailed to cleats which have been fastened to the posts and cross members.

The top is made up of two panels of $\frac{3}{4}$ -in. plywood, the lower panel being $20\frac{1}{8}$ in. wide and the upper one $13\frac{3}{4}$ in. wide. These are glued together, with a rabbeted back rail and end blocks added to form the small-parts hopper as shown below. The top is fastened securely to the bench with the lag screws driven up through the bench rails. It should be located so the left-hand side overhangs the bench sufficiently to provide clearance for a vise.

The drawer front is of $\frac{3}{4}$ -in. stock and the sides, back and bottom are of $\frac{1}{2}$ -in. lumber or plywood. Note that the drawer contains two side compartments and a 6 x 20-in. removable tray. Sides, front and back are grooved to receive the edges of the drawer bottom. The grooves must be located high enough to permit installing a standard drawer guide and slide. The guide is shown in the bench-framing detail and the slide is simply a grooved cleat fastened to the underside of the drawer fitted to slide smoothly over the guide. ★★★





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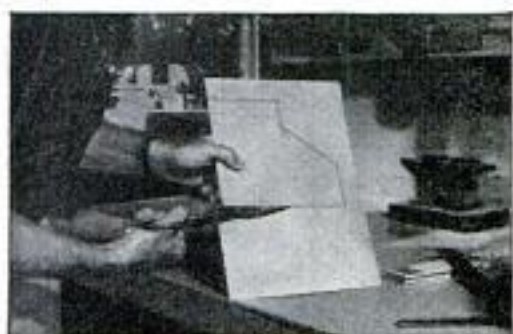
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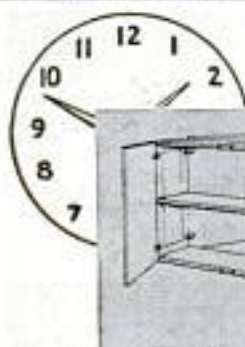
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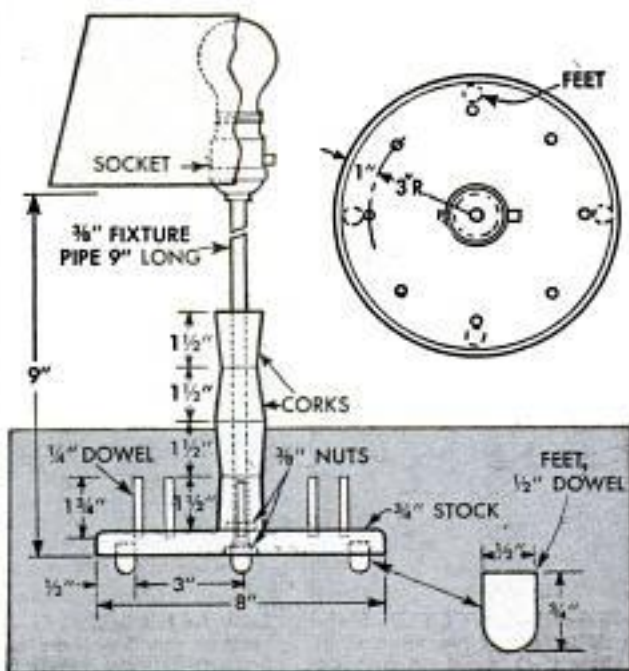
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Sewing-kit LAMP

By I. M. Fenn

ANYONE WHO SEWS will appreciate this lamp that not only provides light for the work, but also keeps the spools of thread handy. The base can be made of wood, or an unusually attractive lamp can be produced using plastics of harmonious colors for the various parts. Cut out the base, drill the holes indicated in the plan and then round off the top edge for a more pleasing appearance. Next cut the pegs and feet from dowel stock. The fixture pipe is fastened to the base with two $\frac{3}{8}$ -in. nuts, one turned against the top of the base and the other into a counterbored hole in the underside of the base. The pipe is covered with large corks drilled to slip over it. The corks may be stained, painted or left their natural color. Now assemble the base, using glue to fasten the parts together. Then push the lamp cord up through the fixture pipe and attach a standard socket.





Ask your hands to tell you

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Stanley is the toolbox of the world.

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*The Stanley rafter square tongue is 16" long.

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The most essential ingredient in any gluing operation is the gluer's know-how. First of all he must know his glues, as the choice of the right glue will do much to make any glue job a success. Finding a good glue to suit the job is not difficult with the wide variety being offered today.

Hide Glue: This has long been acknowledged as the best for all-around woodworking. The liquid hide glues now on the market are as strong and durable as the old flake variety, and much easier to use.

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Liquid Resin Glue: These glues look like thick milk. They are not quite as strong as hide glue for woodworking, but are ideal for model work, leather, paper and general household purposes.

Resorcinol Glue: This is a powder that must be mixed with a liquid catalyst. The resulting mixture is a completely waterproof glue for outdoor and marine use.

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Black Mastic Cement: These cements give good adhesion and are waterproof. Used for bonding metals and for tile and linoleum.

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GIFT FROM MY FOLKS



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Drill Press . . . \$57⁵⁰

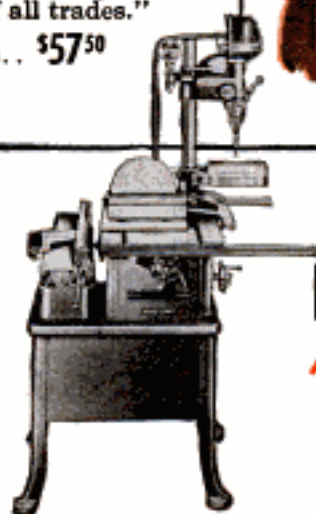
MY KIDS JOINED FORCES TO
GIVE ME THE SANDER



This handy, low cost tool is perfect for finish-sanding jobs—has many other uses, too.

Sander . . . \$17⁵⁵

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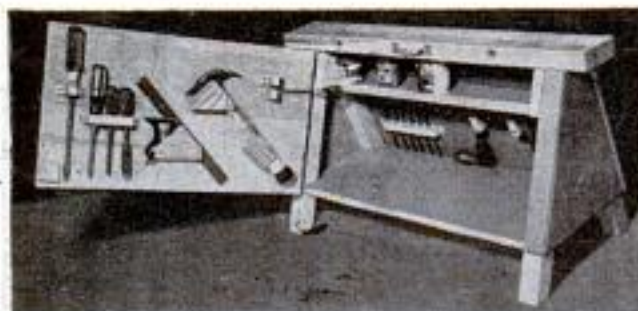
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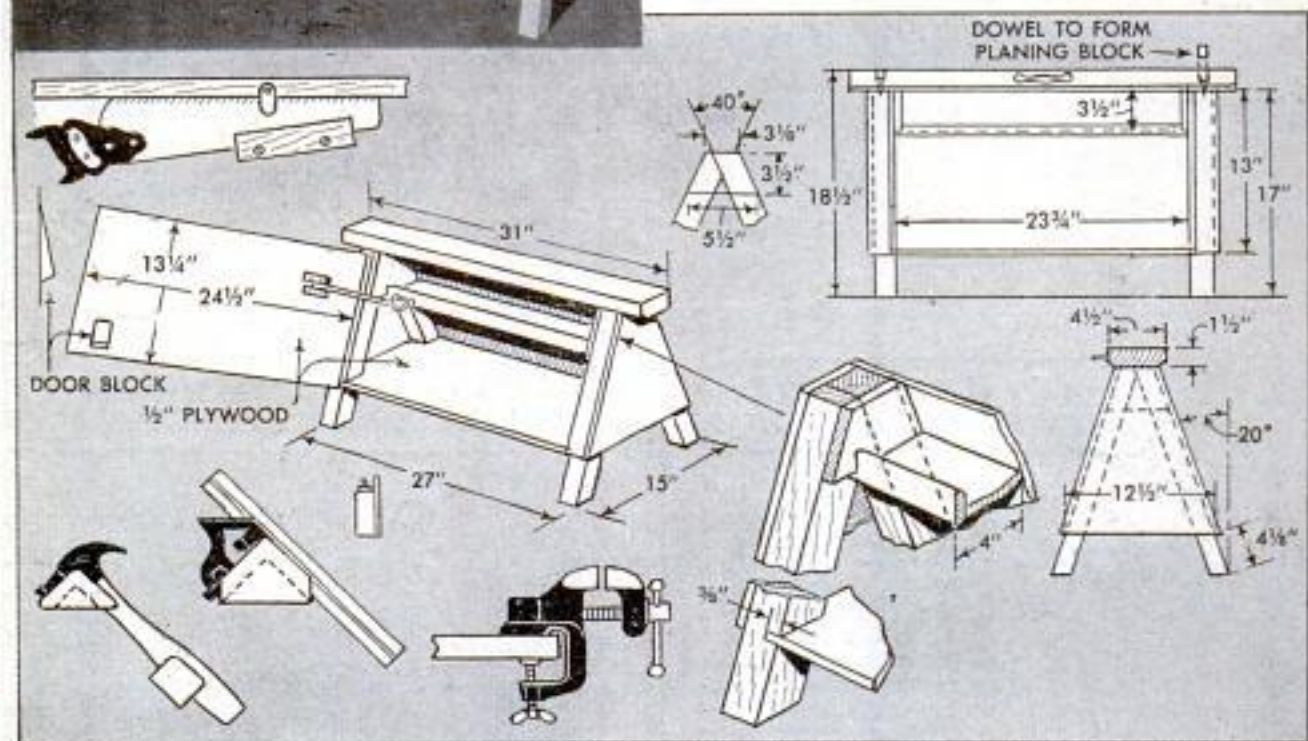
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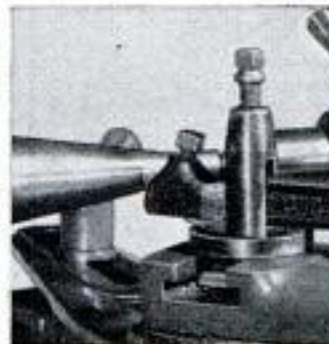
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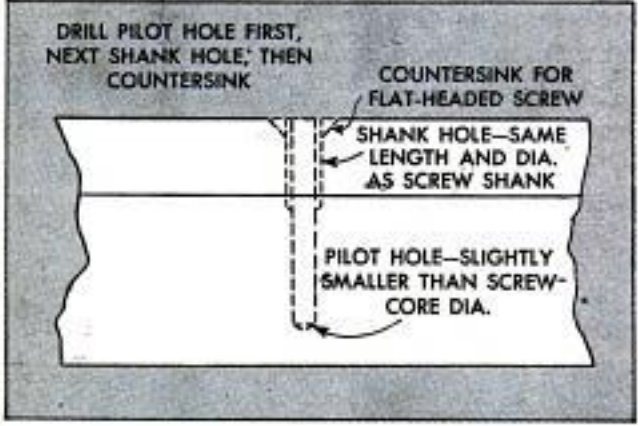
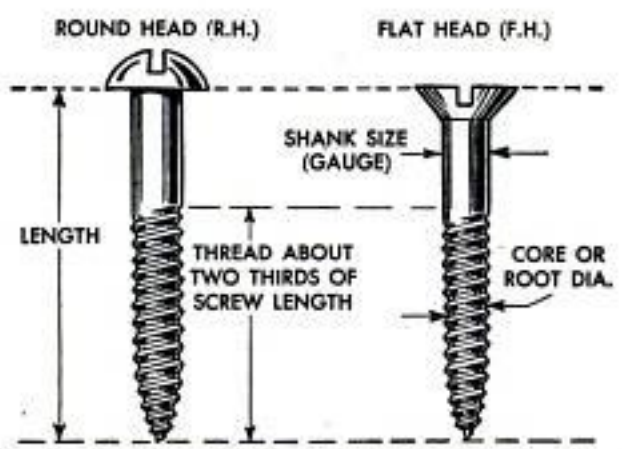
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the original solid center auger bit
screw drivers
screw driver bits



How to Buy WOOD SCREWS

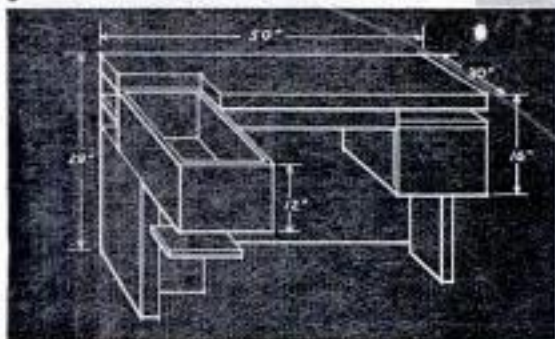
WHEN BUYING wood screws, you should know what to specify and the correct order in which this information is given, so that you will get exactly what you want. This is the accepted practice: (1) length; (2) gauge number; (3) type of head—flat, round or oval; (4) material—steel, brass, bronze, etc.; (5) finish—comes in bright steel, blued, cadmium, nickel or chromium plated. Example: $1\frac{3}{4}$ -in. No. 10 flat-headed-steel, cadmium-plated wood screw. Keep in mind that the proper screw to be used on a job must be thick enough to resist shearing and long enough so that the entire threaded section enters the piece to which you are fastening something.



Gauge Numbers of wood screws, with the diameter shown to the nearest 64th of an inch.

Ga.	Dia.	Ga.	Dia.	Ga.	Dia.
0	$1/16$ "	6	$9/64$ "	12	$7/32$ "
1	$5/64$ "	7	$5/32$ "	14	$15/64$ "
2	$5/64$ "	8	$5/32$ "	16	$17/64$ "
3	$3/32$ "	9	$11/64$ "	18	$19/64$ "
4	$7/64$ "	10	$3/16$ "	20	$21/64$ "
5	$1/8$ "	11	$13/64$ "	24	$3/8$ "

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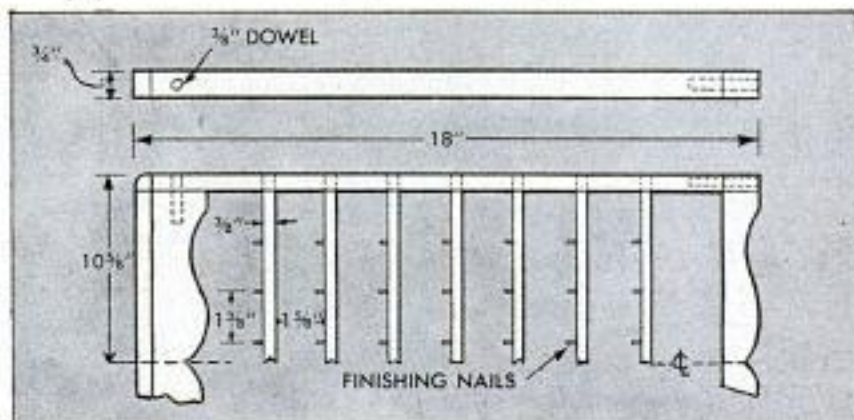
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\$229 delivered (saw blade and custom-built 1/2 H. P. motor included). EASY TERMS.

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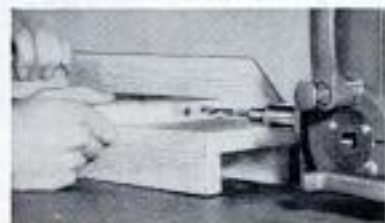
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316

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SANDING ON A DRILL PRESS

RAPID AND ACCURATE sanding of both edges and surfaces of wood can be done by using one of two attachments chucked in a drill press. The attachments are a sanding drum, which does an excellent job on edges, and a 4-in. rubber disk which produces surprisingly good results on flat surfaces. An auxiliary plywood table clamped or bolted to the drill-press table, as shown in the upper right-hand photo, provides a larger work surface. The work is disk-sanded by placing it on a piece of wood to which an L-shaped stop has been nailed. The stop holds the work as the piece of wood is pushed across the auxiliary table under the disk. The lower right-hand photo shows the drum sander being used to sand a curved edge. In this case, a length of lumber is clamped to the regular drill-press table to raise the work sufficiently to allow it to be held against the drum. For best results, use a drum of the largest diameter practical for the job

(Continued to page 316)



Upper photo shows sanding disk in use on drill press. Work held by stop nailed to piece of flat wood is pushed under revolving disk. Below, drum is used to sand curved edge of plywood. Practice with the drum sander is required to follow along a scribed line



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you have at hand.

Several types of fences can be made that will permit more rapid and accurate sanding than may be done freehand. The upper photo shows a fence used with the drum, the fence being a length of straight board in which a hole has been jigsawed to accommodate the drum. The hole is oversize and allows the drum to project slightly past the edge of the fence. The edge of work passed across the drum will be sanded the amount of the projection.



The upper drawing shows a standard fence and the other drawing shows a sanding disk being used to bevel a cabinet door. The fence shown in this drawing consists of two pieces of straightedged scrap aligned and clamped to the auxiliary table.



The table is blocked up at a slight angle to produce a bevel on the door. The photo at the bottom of the page illustrates a fence which is a length of lumber notched to clear the sanding disk. Long bolts pass through the fence, spacer blocks and lengths of lumber which fit under the auxiliary table. Wing nuts on the bolts clamp the fence to the table. In the photo a piece of flat stock is being surface sanded.



In most cases, with either drum or disk, the drill press should be run at fairly high r.p.m. The higher speed produces fewer sanding lines and helps keep the sandpaper from becoming clogged. ★ ★ ★



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NAILS
NO
BOLTS
NO
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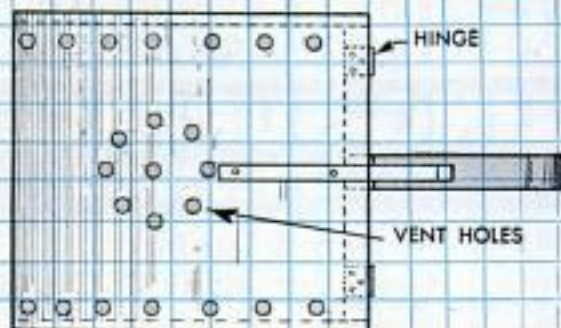


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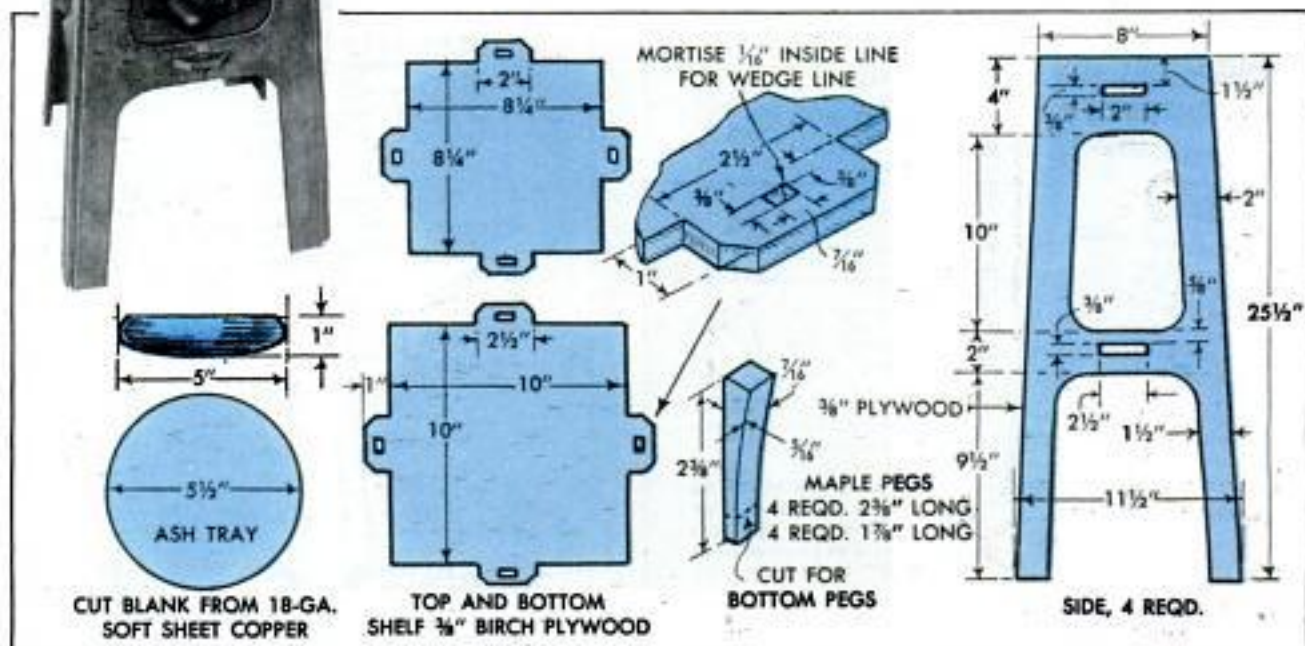
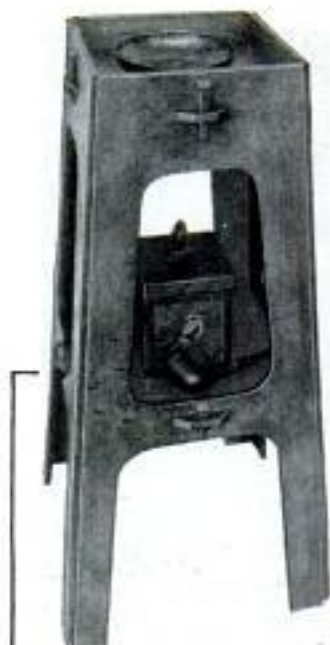
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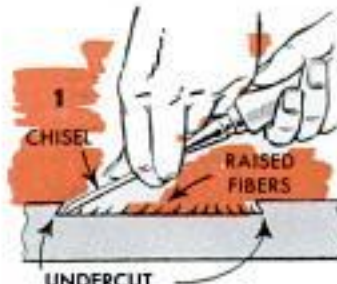
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MENDING SHALLOW GOUGES IN FURNITURE

By Captain John M. Lietwiler, USN

CELLULOSE-FIBER wood fillers, which usually will not hold in shallow gouges in furniture, can be used successfully if mixed with powdered plastic-resin glue. First, undercut the edges and rough up the bottom of the gouge with a wood chisel. Next, put a quantity of filler into a container and gradually add small amounts of powdered glue until the filler becomes stiff, but not crumbly. Immediately work it into the gouge with a putty knife, building it up to 1/16 in. above the surface. Allow it to dry for 24 hrs., then sand flush and refinish.

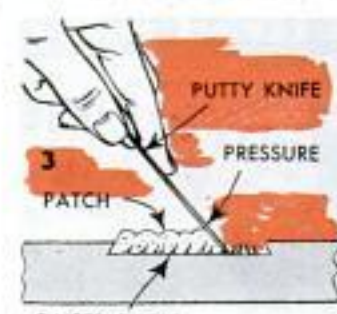
1. Undercut edges and rough up the bottom of the gouge with a wood chisel so that filler will bond with raised fibers on bottom and lock into undercut when it is forced into the gouge with a putty knife



2. Place quantity of filler in container—about twice what is needed to fill gouge—and gradually mix in powdered plastic-resin glue until filler becomes stiff but not quite crumbly



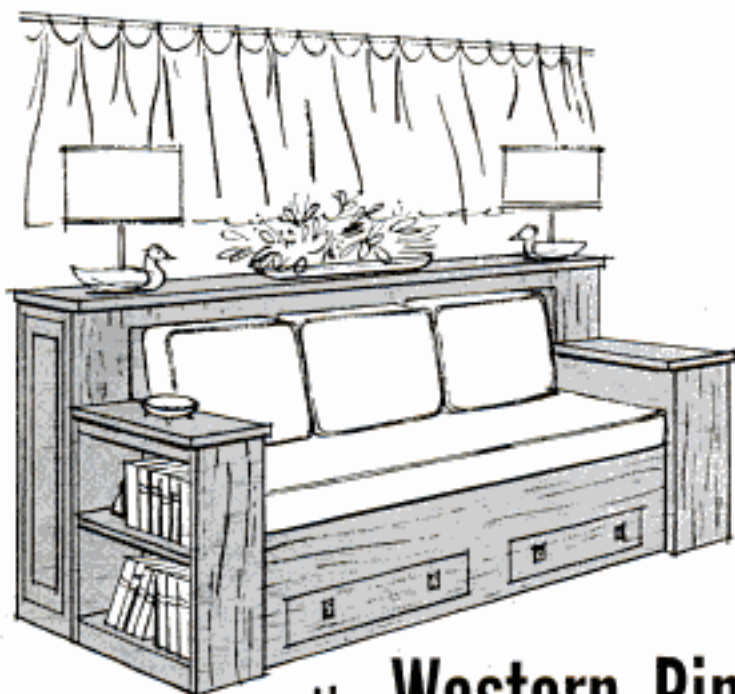
3. Immediately force filler-glue mixture into gouge with putty knife. Add a small amount at a time, keying it into undercut and to the wood fibers in bottom. Build up filler to project above the surface



4. Final step is to allow filler to dry for at least 24 hours. Then carefully sand with perfectly flat hardwood block wrapped with fine sandpaper until patch is flush. Complete repair by matching the original finish



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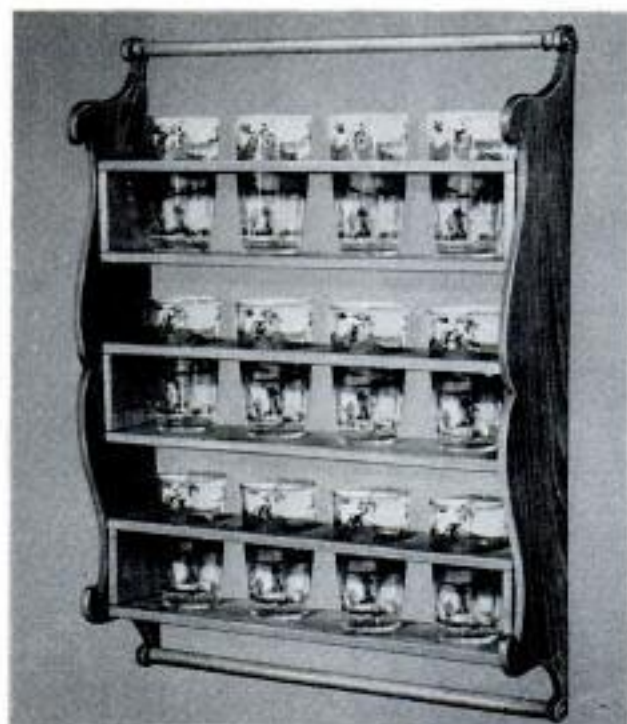
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Combination SHELF-SERVING TRAY

By Carlton Strickland

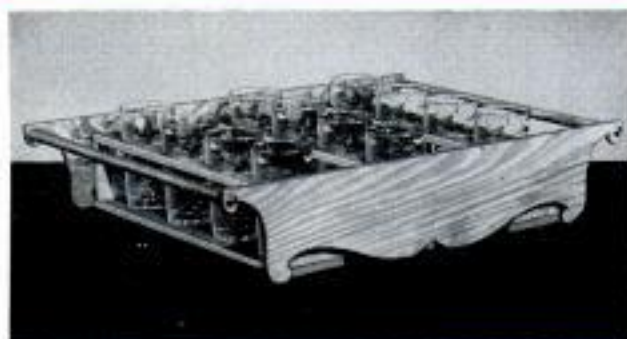


THE PROBLEM of storing large tumblers is solved and an especially handy serving tray is obtained by making this shelf-tray combination. When used as a shelf, the unit with the glasses in place is hung from a wall, thus providing an attractive accessory. When the unit is turned horizontally for use as a serving tray the tumblers remain upright in their pivoted racks.

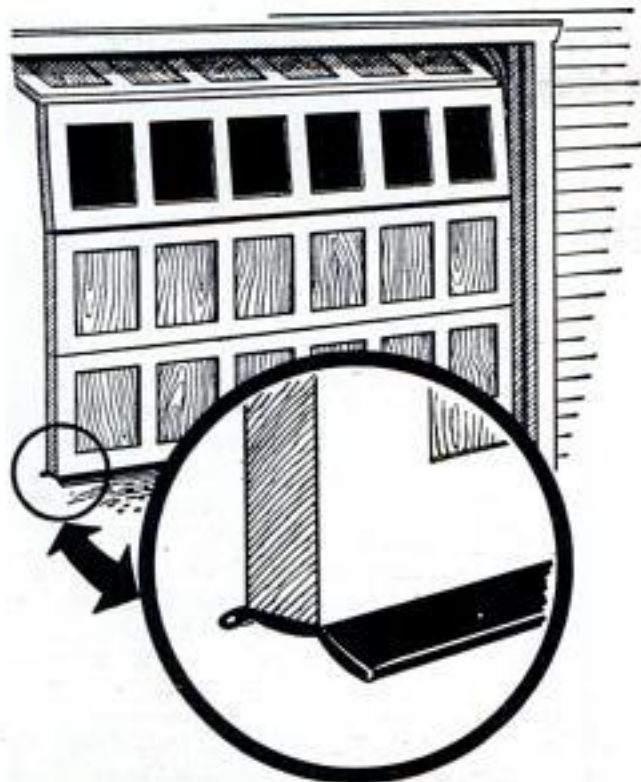
Although the original tray was made from knotty pine dressed to a $\frac{3}{8}$ -in. thickness, almost any kind of lumber, including packing-crate material, could be used. The two handles are lengths of $\frac{5}{8}$ -in. dowel.

Begin making the shelf by cutting out the two sides according to the half pattern. Locate and drill the holes for the pivots and install the dowel handles. Then cut out the parts for the three tumbler racks. Holes

(Continued to page 328)



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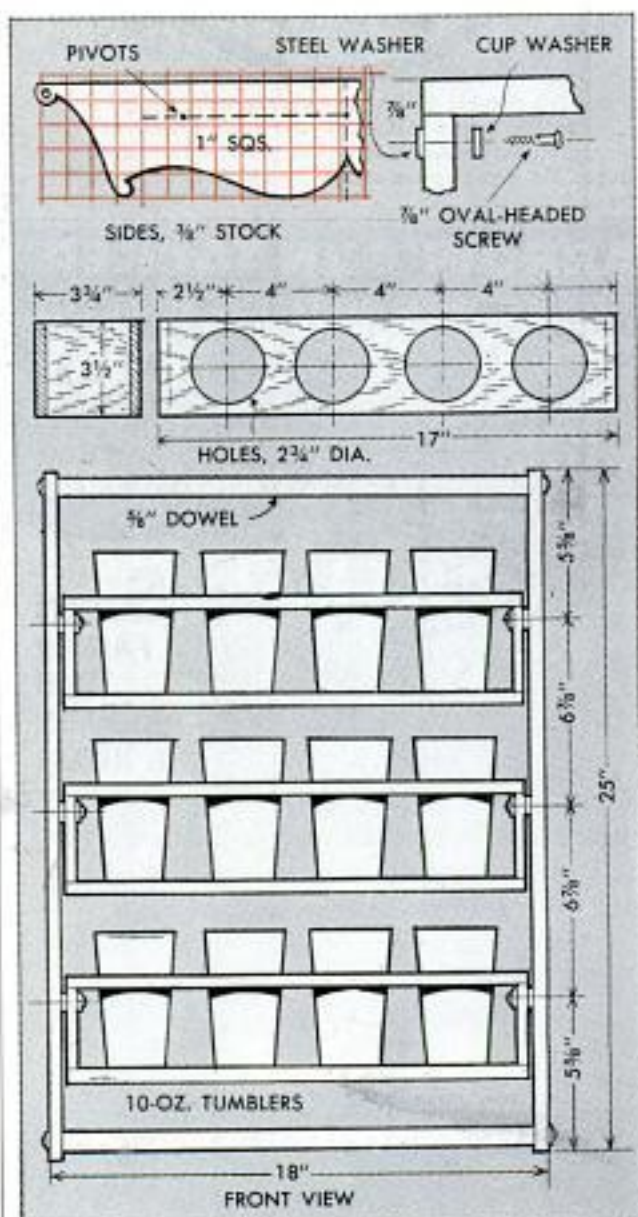
THOMAS PRODUCTS COMPANY
8490 Lyndon Ave. • Detroit 21, Michigan

(Continued from page 326)

for four tumblers are cut in the top section of each rack. The 2 $\frac{3}{4}$ -in.-dia. shown is about right for the typical 10-oz. tumbler. However, check the diameters of the tumblers to be used and cut the holes large enough to permit the tumblers to rest on the bottom of the rack but also hold them steady. Then the end sections of each rack are cut to size, drilled for the pivoting screws and fastened between the top and bottom sections with glue and brads.

Install the racks in the jigsawed frame with oval-headed screws and washers as shown in the upper right-hand detail below. Use a flat steel washer between the rack and the shelf side and a cup washer on the inside of the rack. The racks should swing freely on the pivot screws.

Paint or stain the shelf-tray or finish it natural. It's best, of course, to sand all the parts thoroughly and finish them before final assembly. ★★★



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No. 41

True False

Cutters on some pliers are so keen and accurate they snip bond paper clean as scissors!



No. 259-P

True False

Cutters on some pliers are so tough they're tested to 100,000 cuttings of tempered steel plow wire .080" diameter.



No. 50

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No. 507

True False

Some pliers are tested by applying 150 lbs. pressure on handles. They must pass this test before shipment.



No. 91

True False

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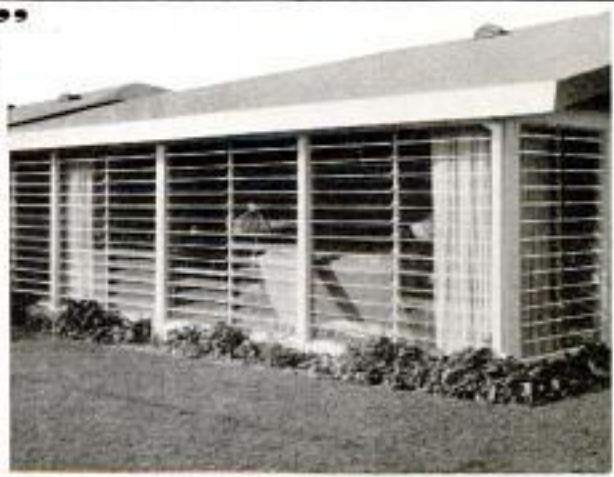


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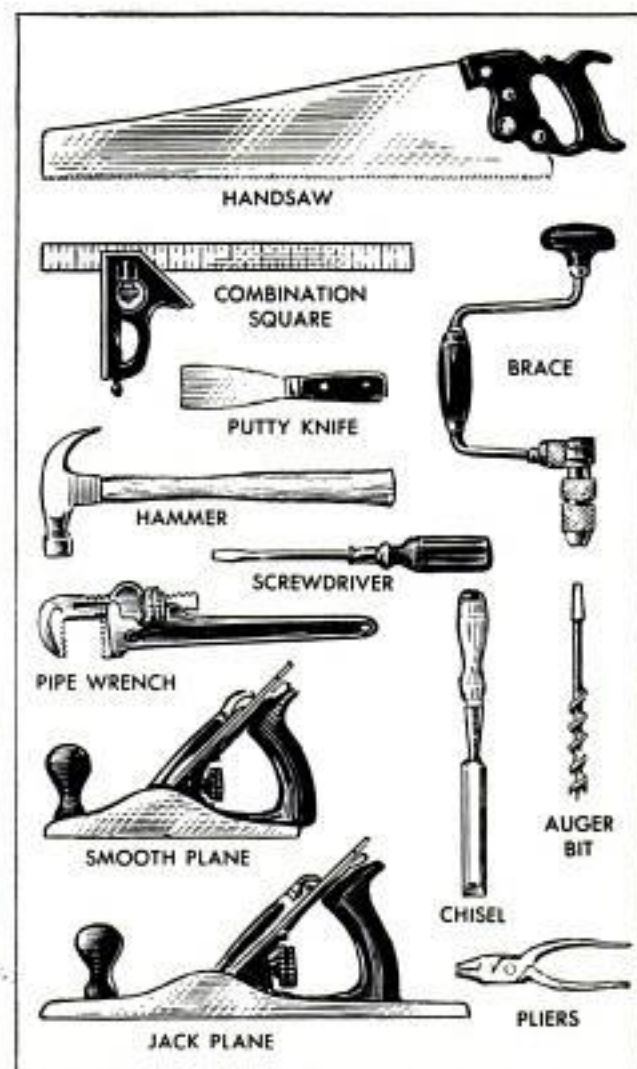
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1 Screw Driver	1½ in.	4 Chisels	¾ in., 1½ in., ¾ in., 1 in.
1 Hand Saw	24 in.	1 Try and Miter Square	12 in.
1 Pair Pliers	6 in.	1 Level	18 in.
1 Brad Awl		1 Mill File	8 in.
1 Hand Ax	19 in.	1 Slim Taper File	6 in.
1 Bit Brace	10 in.	1 Putty Knife	
6 Auger Bits,	¼ in., ¾ in., 1 in., 1½ in., ¾ in., ¾ in., 1 in.		

FOR SIMPLE JOBS around the home, such as repairing a faucet, fitting doors, making shelves or simple storage cabinets you will need the basic, or primary, hand tools. The 12 tools pictured above are a good first selection but you may want to substitute a block plane for the jack plane or you may see the need of a full set of chisels and auger bits. All tool selections are flexible. The table above lists a more complete selection with which you can handle quite complicated projects, especially in woodworking. Of course, you will want to add to the original list until the selection for your purpose is complete.

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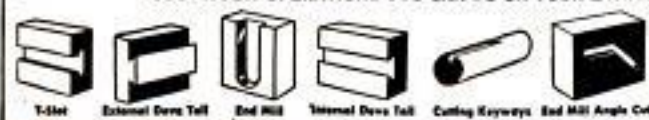
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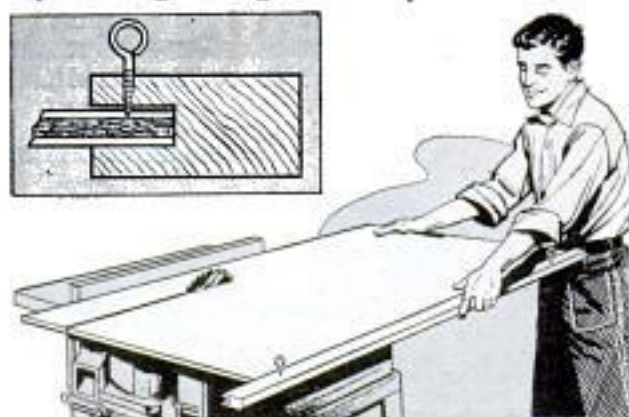
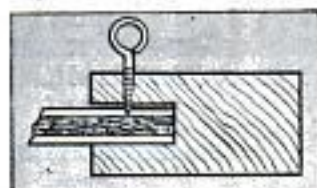


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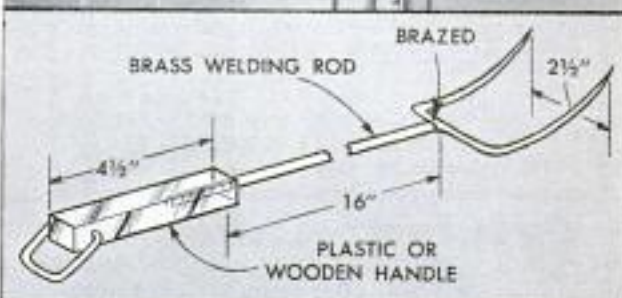
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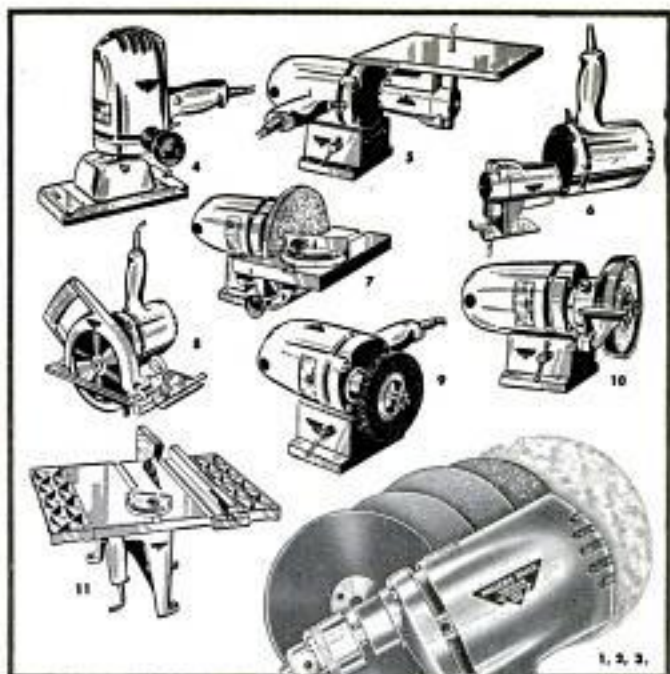
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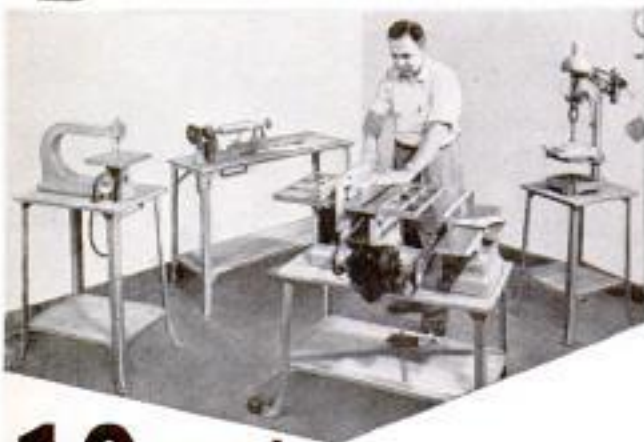
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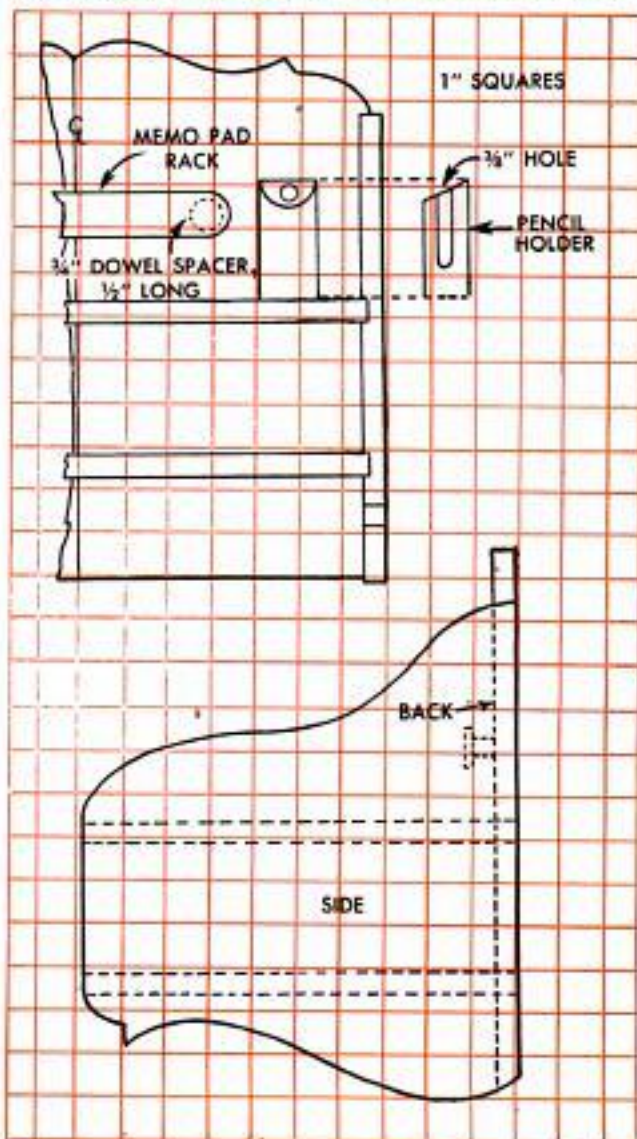
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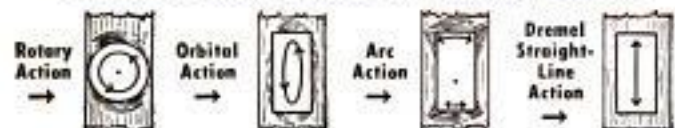
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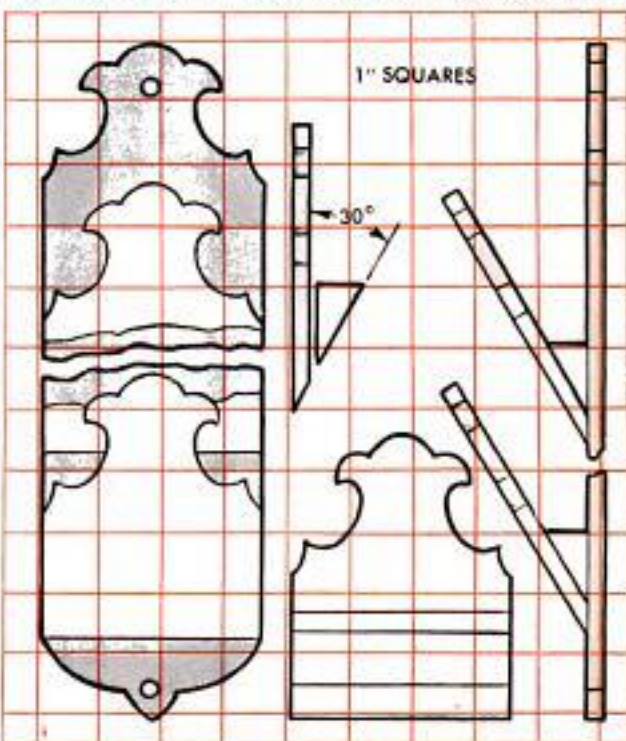
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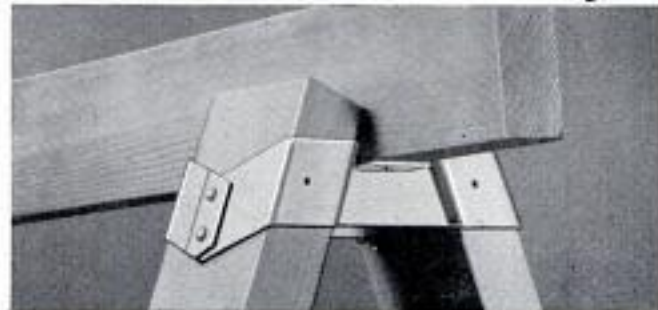
COUNTERSINKING holes with an over-size drill does not properly seat the head of a flat-headed screw like a regular countersink which is ground to match the angle of the screwhead. Countersinks, three types of which are shown above, are made with straight shanks for use in drill presses and hand drills, and with square and square-taper shanks for use in tap wrenches and braces. A stop attached to the shank is used to control the depth; in woodworking the depth should permit covering the screwhead with filler. In metalwork, the hole is countersunk to bring the screwhead flush.



Reamers are made in two general types, the taper reamer and the straight reamer, the latter actually having a very slight taper. In metalwork, separate pieces often are drilled undersize and bolted or clamped together. A taper reamer is used to align the holes, then a straight reamer is used to remove the taper of the hole to provide a snug fit for bolts or rivets.



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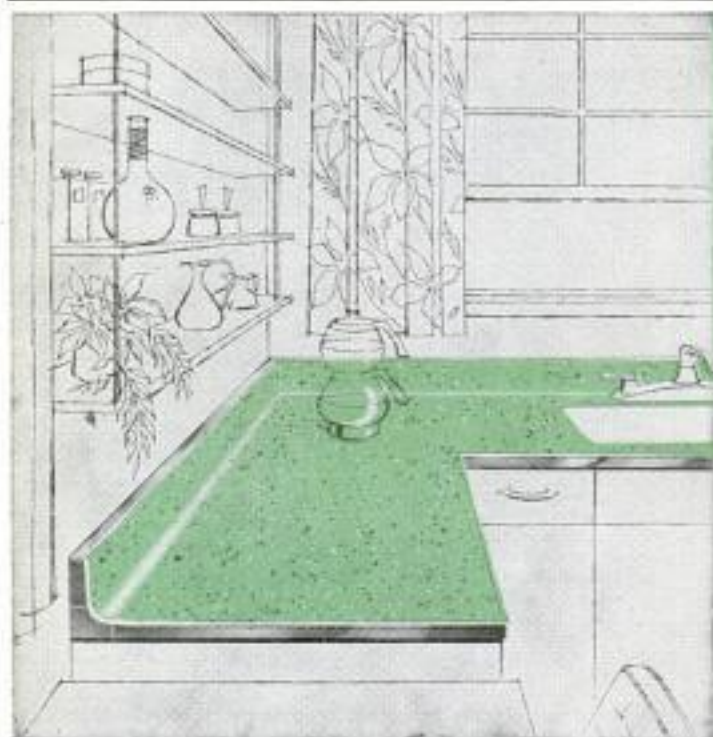
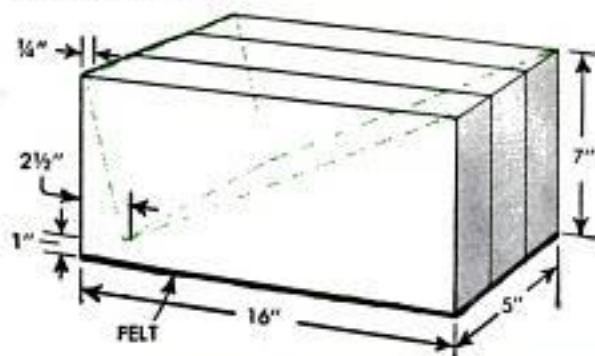
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has dried, saw the laminated block according to the dotted lines in the detail. You can finish the bookrack by staining and varnishing or by painting it in any color desired. After finishing, cement felt to the underside.



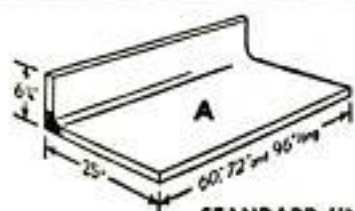
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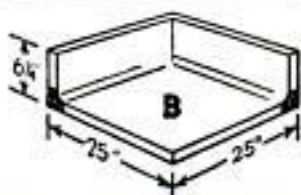
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PAINTING HINTS

USUALLY early fall is the time for exterior painting. As a rule the weather is cool and dry for long periods, providing ideal drying conditions between applications. Good paint, properly applied every three to five years is one of the cheapest home repairs. It increases the appraisal value of the property, discourages fungus growths and protects wood surfaces against weathering and changes in moisture content that cause swelling and checking.

On surfaces that have been previously painted, the amount of preparation depends on the condition of the old paint film. If it is in good condition, unbroken and chalking normally, then it will require only a thorough dusting. Wire-brushing or sanding is not necessary unless the old paint is flaked or blistered. Then all loose paint should be removed and the defective surfaces wire-brushed and sanded to feather the edges of the breaks so they will not show when repainting. Prime any exposed

wood and be sure that the primer is thoroughly dry before applying new paint.

Selecting the paint depends on whether the job requires one, two or three coats. As a rule, on old work in good condition, one coat of undercoater and one finish coat will give a first-class job. Where defective paint is removed to the bare wood in preparation for repainting, the areas involved should be spot-primed before final application of the undercoat and top finishing coat. When preparing undercoaters and ready-mixed paints for use, give careful attention to the manufacturer's instructions for reducing to a brushing consistency. The paint must be thoroughly mixed before use.

Use a brush of the correct size. A 4 or 5-in. brush is best for use on wide siding. It's faster and holds more paint, making frequent dipping unnecessary. Use a 1-in. brush for cutting in sash and door panels and a 2 to 3-in. brush for painting door and window trim.

Begin painting at the highest point on the house and work down. If you are working from a ladder, bring the trim down at the same time. When painting siding, coat the lower edges of the boards first, then finish the faces of the boards with sweeping strokes of the brush. To avoid laps, paint to a corner or a window or doorframe before stopping.



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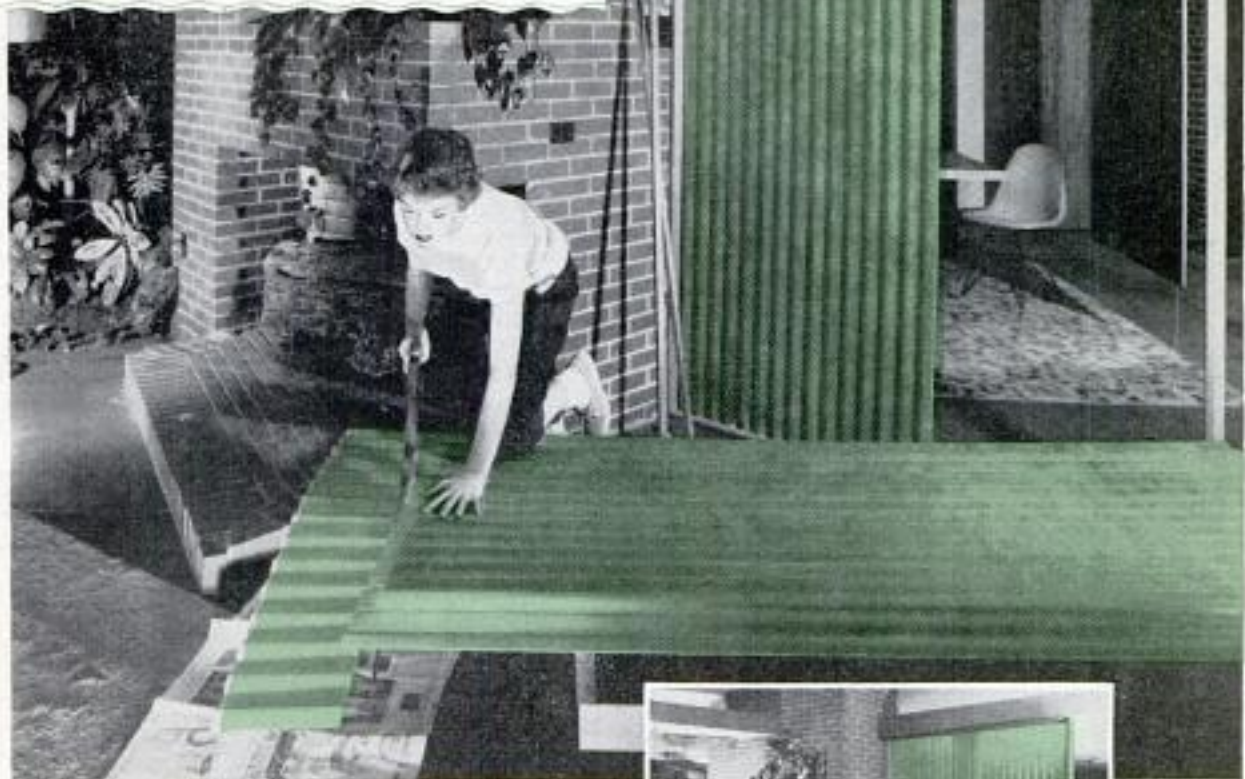
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WIRING HINTS

How Many Appliances?

In older houses, branch circuits are wired with No. 14 wire to carry 15 amps. The fuse blows when more than 15 amps. are drawn. Add the total amperage used by the units you intend to use on one circuit. Do not attempt to use more than a total of 15 amps. at one time. Do not attempt to replace a 15-amp. fuse with a 20 or 30-amp. fuse in order to use more appliances, as overloading will cause the wires to overheat, creating a fire hazard. Newer houses usually are wired with No. 12 wire, which carries 20 amps., permitting more appliances to be used

CURRENT DRAWN BY TYPICAL HOUSEHOLD APPLIANCES

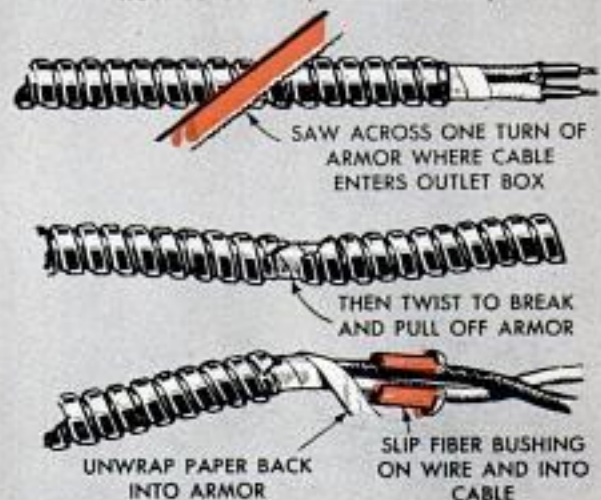
Appliance	Amps.	Appliance	Amps.
Auto. Toaster	7 to 11	Fluorescent Tube	$\frac{1}{8}$ to $\frac{1}{2}$
Auto. Washer	5 to 8	Electric Blanket	$1\frac{1}{2}$ to 2
Refrigerator	3 to 6	Portable Heater	7 to 11
Vacuum Cleaner	4 to 10	Television Set	$2\frac{1}{2}$ to $3\frac{1}{2}$
Iron	5 to 10	Roaster	10 to 14

Tying the Underwriter's Knot

When attaching a new plug to an appliance cord, it is advisable to tie the Underwriter's knot, as shown in the detail, before connecting the wire to the plug. This knot will prevent the cord from being pulled out of the plug, helping to avoid the possibility of short circuits and blown fuses



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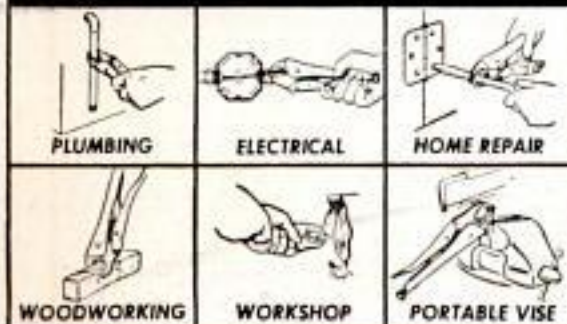
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SCHILDT: One thousand dollars.

LINDBLOM: This will floor you. I got my entire house and one wall in the garage plastered for \$350, including labor and material. It was a slack time in the building trades and my contractor did his own work.

O'NEIL: My walls are knotty pine and cedar paneling, except for the bedrooms. We are going to dry-wall them ourselves.

Q: Did you do your own wiring?

LINDBLOM: I did all my own wiring with the exception of having it hooked up to the service box. I used the touchplate system as described in the plans. I found it very convenient in running switches.

SCHILDT: I did not do my own wiring.

O'NEIL: I did all of mine except running the circuits into the fuse box. And here's something to remember. I used No. 12 wire. I understand you can use 14, but I figured 12 would be safer. Consequently, we used half-inch conduit. I probably should have used three-quarter inch conduit. In using half-inch, I had to run extra conduit sometimes, just for a single wire. Now I wish I had considered the touchplate system.

LINDBLOM: I also used the No. 12 wire throughout. We are allowed to use Romex in Arcadia.

SCHILDT: I used 12 and 14, depending on the loads. I used BX and some neoprene, the latter underground to eliminate overhead wires. I used rigid conduit in my foundation on the exterior walls.

Q: What about the plumbing?

O'NEIL: For the sewer end of it, I hired a plumber. There were a few things I did myself like hooking up to the lavatory and to all fixtures. I put in the water pipes myself, found that fairly easy.

SCHILDT: I had a plumber come in, but I did run my own water from the city water line (400 feet away) into the house. I ran all my own waste drains out and made my septic field and installed the septic tank. (I learned that after you bury a septic tank you should fill it with water immediately. This keeps it in the ground in case of rain.) For the heating and plumbing, interior work, leading and things like that, I let the plumber do it because to buy tools would be an extra expense.

O'NEIL: The company from whom I bought my plumbing equipment loaned me the tools.

LINDBLOM: I had a plumber come in and put in the sewer pipes and do the leading. I dug the trench myself. I figured it would cost too much to buy or rent the tools. I did put in my water and gas pipes.

SCHILDT: When I bought my plumbing supplies I went to a manufacturer's showroom and made a list of the retail prices.

(Continued to page 348)

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Then I called up a distributing house and asked how much they wanted. It was a thousand dollars less. I paid \$1700. For my 2 1/2 bathrooms and my entire heating system and my kitchen equipment, I paid \$2800. That is completely installed.

Q: What type of floor did you lay?

O'NEIL: In the living room and hall I'm laying hardwood flooring. Just inside the front door we have a square of ceramic tile 4 by 5 feet with a 3-inch concrete slab. We have asphalt tile in the bedrooms and bathrooms, linoleum in the kitchen.

SCHILDT: I used rubber tile throughout the house, except in the bathrooms and kitchen where I used ceramic tile and vinyl linoleum. Under the tile I had to lay 5/8-inch plywood in order to get a smooth working surface.

LINDBLOM: I used ceramic tile in the bathroom and cork in the two bedrooms and living room. In the kitchen and breezeway, or den, I have asphalt tile.

SCHILDT: I used second-grade rubber tile, costs one-third the price of first-grade and what few imperfections there are can be used easily in out-of-the-way places like closets.

LINDBLOM: I also used seconds in my asphalt tile.

SCHILDT: Here's something I learned about laying tile: Always start in the center of the room and work out, so you don't have a full tile on one side and just a little sliver on the other. Also, when you are finishing off, lay your last tile—the one you have to cut—squarely on top of the one you just laid, and then use a third tile and just butt that against the wall and cut the last tile.

Q: What about heating installations?

O'NEIL: I had mine done—forced-air heat.

LINDBLOM: I have a forced-air gas furnace. It is placed in the attic out of the way. Ducts to the center of my ceilings and openings with fins deflect the heat and throw it down to the floor. It works ideally. I hired the installations done. It cost me \$425.

SCHILDT: I used hot-water baseboard heating throughout the house. That was included in the plumbing.

Q: Did you give any consideration to air conditioning?

SCHILDT: I have a spot located so I can put in one of the small units to air condition my two main bedrooms. I can stick the grillework through the outside wall behind some shrubbery and the machine itself will be hidden in the bottom of a closet.

LINDBLOM: I have no air conditioning.

O'NEIL: Nor have I.

Q: Do you have any advice on cabinet work?

(Continued to page 350)

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SCHILDT: I made my kitchen cabinets out of plywood treated with a plastic coating. Here's something I found helpful: Just before you plaster, be sure you mark off the center line of your studs on the floor so you can find them again.

Q: How long did it take you to build your home?

SCHILDT: It took me 9½ months—from the middle of June to April 2. When we moved in my doors were not hung and my tile was not down.

LINDBLOM: The concrete was poured March 31 and we moved into the house around Jan. 1. That is nine months and I spent half of that time on the road, so I figure it took me 4½ months of actual building to finish the house.

O'NEIL: It is taking 17 months of spare-time work to build my house.

Q: Can you estimate how much you saved by building your own homes?

SCHILDT: My house, including lot, cost me \$18,000. A real estate agent told me it's worth all of \$35,000 right today—that's \$17,000 to the good.

O'NEIL: My house would cost about \$20,000 to have built. It cost me \$14,000 plus my labor. If I put it up for sale I might get \$25,000.

LINDBLOM: My house cost me \$7000. My garage, of course, was on the lot. A contractor told me the house would have cost \$15,000. I figure I saved \$8000 by building it myself. I could sell it for \$20,000 or more.

Q: What was your worst mistake?

SCHILDT: My worst mistake was not using steel beams in the basement. I priced a steel beam for across my garage (it's in the basement) and it was \$50. I figured a steel pipe filled with concrete would cost me \$7, so I said that was it. I have a wood beam with no support between walls in my recreation room. That is 16 feet long. There is a slight sag in the center of that now and I'm going to have to tear it out and put in a steel beam someday.

O'NEIL: I think you'll find that true in most places. In regard to mistakes, my biggest on was not thinking the whole thing through. I didn't do enough planning, figuring on costs or shopping around. I did not do enough checking on my levels and verticals.

Q: Would you build it yourself again?

SCHILDT: Yes.

LINDBLOM: I certainly would. Also, I would follow a how-to-do-it plan as I did before—especially after hearing what I have today about the mistakes made.

O'NEIL: Yes, I'd do it again despite the mistakes and backaches. Aside from saving a lot of money there's a big thrill in building your own home. ★ ★ ★

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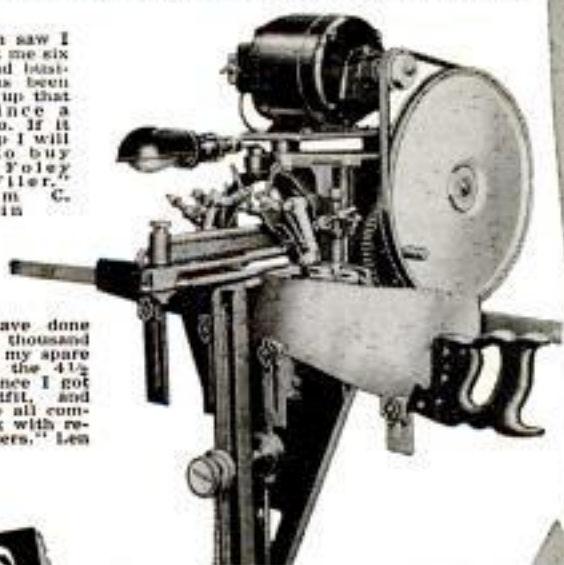
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WILLIAMSVILLE, N. Y.

Multiple-Speaker Enclosures

(Continued from page 247)

INFINITE BAFFLE — BILL OF MATERIAL			
ITEM	REQ'D	INCHES	NAME
1	4	3/4" x 4 1/2" x 5 1/4"	Spk'r panels*
2	2	3/4" x 4 1/2" x 3"	Blank panels*
3	1	3/4" x 8" x 4-13/16"	Spk'r pan. div.*
4	2	3/4" x 9 1/4" x 2"	Inside pillars
5	1	3/4" x 9 1/4" x 8"	Back*
6	2	3/4" x 10" x 7 1/2"	Top and bottom*
7	2	3/4" x 3/4" x 9-5/16"	Front pillars
8	2	3/4" x 1 1/8" x 9-5/16"	Rear pillars
9	4	Type 4J4 Jensen PM speakers (4")	
Note—	1	Piece of glass-fiber insulation (see text)	
	1	6-terminal output strip	

*=PLYWOOD

BACK-LOADED SYSTEM — BILL OF MATERIAL			
ITEM	REQ'D	INCHES	NAME
1	4	3/4" x 9 3/4" x 12 1/4"	Spk'r panels*
2	1	3/4" x 8" x 10"	Top for panels*
3	1	3/4" x 12 1/8" x 13"	Front brace*
4	1	3/4" x 22 3/4" x 26 1/4"	Back*
5	1	3/8" x 27 1/4" x 14 3/8"	Top trim*
6	1	3/4" x 26 3/8" x 14 3/4"	Bottom*
7	3	3/4" x 1 3/8" x 24"	Front pillars
8	2	3/4" x 3/4" x 24"	Rear pillars
9	4	3/4" x 5" x 8"	Braces*
10	4	Type P6TX Jensen PM Speakers (6") (extended range; 3-4 ohm v.c.)	
11	1	1/2" x 6" x 6" piece of sponge rubber	
12	1	15/32 shank d.p.d.t. bat-handle switch switch	
13	1	2-terminal output strip	
14	5	3/16" x 1 1/4" x 24 1/4" Trim slats	
Note—	1	26" x 45" piece of grille cloth	

*=PLYWOOD

the other way four speakers are in parallel for 16 ohms. The switch is mounted directly on the back panel below the two-terminal output strip. The grille cloth is held on the back-loaded system by slats, item 14. The frames for both enclosures should, of course, be sanded and finished before the grille cloth is applied. The back panel is held in place by wood screws as illustrated in photo H. The terminal strip and switch have not yet been mounted. The standard grille cloth should be large enough to permit about 1 1/2 in. to be tacked under the bottom. At the top, the cloth is held by 3/8-in.-square wood strips nailed to the underside of the top trim, item 5, between the pillars.

Detailed student material list R-428 is available from Popular Mechanics Radio-TV and Electronics department upon receipt of ordinary letter postage. ★ ★ ★



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Don't Get Lost in the Wilderness

(Continued from page 133)

move until you have made a definite plan.

2. Shout, call or shoot into the air three successive times at frequent intervals if companions may be near by.

3. Try to recall the circumstances that caused you to get lost.

4. If you have food, ration it to last for several days. Look for fruits and berries.

5. Establish a camp where you are. Pile up rocks or branches, marking a base from which to operate.

6. Go up a hill or climb a near-by tree to look for some familiar object. Always come back to your base camp if you fail to recognize anything.

If you must leave the area, mark your route by signs at regular intervals. Strips of cloth or paper may be fastened to trees or bushes. Branches may be broken and left hanging. Rocks may be arranged on the ground to form an arrow, marking your direction. Always know which way you are going. Here are some aids in finding and keeping directions:

1. Learn to use a compass, of course.

2. In taking compass bearings, sight the compass on an object some distance away, go to that object, then sight from there on another object and proceed to that. Do not try to carry the compass and follow the needle as you walk.

3. If several are in the party and there are no objects to sight on (as in snow fields or during fogs or storms), direct them ahead of you in a straight line while you stand holding the compass.

4. Keep in mind the general direction of rivers and ridges.

5. Check the compass often on the way in. Remember that 180 degrees from the direction you go in is the way out.

6. Establish prominent landmarks on the way in, such as trees, rocks, mountains.

7. The sun is directly south at noon. Your watch makes a fairly accurate compass. Point the hour hand toward the sun; half-way between the hour hand and 12 is south with the watch on standard time.

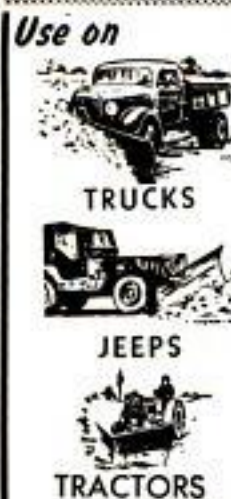
8. Determine the direction of prevailing winds on ridges as you go in. Trees often bend away from these winds.

9. If crossing a wide, snow-covered or desert area, mark your route if there is a chance of fog or storm. Wands or branches with cloth strips attached will do.

10. In woods, streamers may be tied to low tree branches or other objects, especially if children are in the party.

Getting lost, even briefly, is frightening. Don't get panicky. Follow these rules and you'll come through safely. ★ ★ ★

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Member Pennsylvania Grade Crude Oil Association

Owners Report on the Corvette

(Continued from page 122)

who would like to have plastic bodies on their family cars:

"Quietest body I have ever driven."—Wyoming druggist.

"Cool on the hottest of days. Tough. Doesn't dent or show scratches."—California civil engineer.

"I fixed a hole in right front fender myself in less than 3 hours, not counting painting. As easy as repairing a plastic toy. No wrinkles to pound out and no dents. After painting you can't tell the difference."—California foreman.

"Easy to keep clean, cool and no rust from salt on icy roads. Hood and rear deck did warp in Florida sun though."—New York plant owner.

"Cool and light, but apparently strong. Door panels cracked at front on both sides where they pressed against body."—Georgia physician.

"Like plastic, but unable to find anyone that knows anything about fixing a smashed fender."—California student.

"Seems to scar with very slight bumps in hot weather."—Ohio executive.

"Can't get doors, hood and deck lid to fit."—Virginia race-track promoter.

"Had back fender repaired. Small section was over \$100. A steel body repair of same type would have been less than \$25."—Michigan owner.

Automatic Versus Hand Shifting

When the Corvette was first announced as being available only with Powerglide, the automatic transmission, sports-car fans moaned audibly. They love to use the clutch and are expert at it. But Corvette

(Continued to page 358)

There is no glove compartment on the dash, but two door compartments provide ample storage facilities



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\$15.50 used good condition. Instructions incl. 210 Amps. 28V. **\$21.50** NEW

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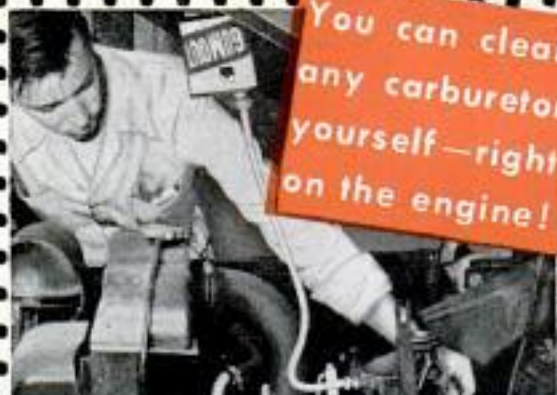
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owners who participated in our survey are of a different opinion. Only 10 percent said they would prefer a hand shift. Several said they could do better in acceleration runs with the automatic unit.

"The lack of a requirement to shift gears makes it a very formidable machine in a drag race."—Ohio test pilot.

But there were some who said they wanted a conventional transmission.

CHEVROLET CORVETTE SPECIFICATIONS

ENGINE

Type 6-cyl., in-line, OHV
Bore and stroke 3-9/16x3-15/16 in.
Piston displacement... 235.5 cu. in.
Brake horsepower.... 150 at 4200 r.p.m.
Compression ratio.... 8.0 to 1
Transmission Torque converter with gears

GENERAL

Steering ratio (over-all) 16.0:1
Steering wheel (lock to lock)..... 3.9 turns
Turning radius..... 19.5 ft.
Brakes Conventional hydraulic with bonded linings
Tire size..... 6.70x15
Recommended 22 lb. front and rear normal tire pressure..... 28 lb. for sustained high speed
Shipping weight..... 2705 lb.
Wheelbase 102 in.
Tread, front..... 57 in.
Tread, rear..... 59 in.
Height, over-all..... 52.16 in.
Width, over-all..... 72.24 in.
Length, over-all..... 167 in.
Road clearance..... 6 in.

CAPACITIES

Oil 5 qt. (6 qt. with filter)
Water 18.25 qt.
Gasoline 17.25 gal.

INTERIOR DIMENSIONS

Front-seat width..... 57.20 in.
Headroom 35.40 in.
Legroom 41.00 in.

"Unable to shift down satisfactorily with Powerglide."—Michigan pilot.

"Do not care for Powerglide. Slippage component is too much. Powerglide is dragging its feet."—California television producer.

Although the owners agree that the Corvette is a great fun car and, while it may not be in the same league as the Mercedes or the Jaguar, it offers something these cars can't—a dependable, untemperamental engine that can be repaired in any corner garage if it should go bad. One man who has owned Jaguar, MG, Mercedes, Triumph, Austin Healey, Allard-Cadillac and other sports cars described its appeal well when he wrote:

"It combines reasonable sports-car characteristics with comfort and sex appeal, American service and parts. It is better for general use than a foreign sports car, but not suitable for serious competition."

Turn back to page 119 for Floyd Clymer's road test of the Corvette. ★ ★ ★

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Corvette Road Test

(Continued from page 119)

top end was not needed even when wide open). The car will do an honest 105. With a rear-axle ratio of 3.55:1, the car almost loaf along at 90.

The tuned Blue Flame Chevrolet valve-in-head engine used in the Corvette develops 150 horsepower at 4200 revolutions per minute and has a high-lift camshaft and a maximum torque of 223 foot-pounds at 2400 revolutions per minute. The engine has three Carter side-draft carburetors and is as lively as a tiger. Mechanical tappets and extra-heavy valve springs are used to permit engine speeds of over 5000 revolutions per minute. A split exhaust manifold, dual mufflers and tailpipes definitely aid in keeping back pressure low. A pleasant but rather loud tone results from straight-through mufflers and dual exhaust pipes. The Corvette engine, with modified valve timing for higher engine speeds, is noisier than a stock Chevrolet engine. Acceleration is terrific and the car takes the average hill as if on level ground. The three carburetors apparently are not easily synchronized, as there was some unevenness and overloading.

The short wheelbase contributes to fast cornering at all speeds. Compared with the average American car, it is more rigid, has stiffer springing and does not roll or sway on corners. Stability is good. The dry shipping weight is 2705 pounds without radio or heater, thus making the weight-to-horsepower ratio extremely favorable—approximately 18:1.

The over-all steering ratio of 16:1 is fairly high for a semisports car. It requires 3.9 turns from lock to lock. Fewer turns of the wheel would be better. The steering action should be faster by about 25 percent for easier, quicker handling, which is necessary in fast cornering at high speeds. The turning radius is 38 feet.

Suspension is very good. Rear springs are wider and longer. They have only four leaves as against seven in the regular Chevrolet. There is some plastic-body shake and steering-column vibration.

Full-bonded brake lining is used. There was no evidence of fading and I rate the brakes excellent—in fact, the car is "over-braked" for its weight, a safety feature. Actually, the brakes are standard Chevrolet, with a slightly larger master cylinder, giving the system 3 percent more effectiveness.

The driving position is very comfortable and I like the angle of the steering wheel. The contour of the bucket seat and back

(Continued to page 362)

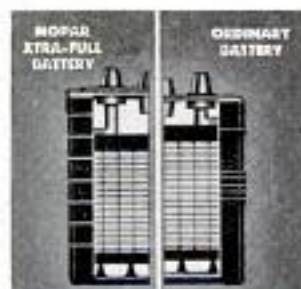
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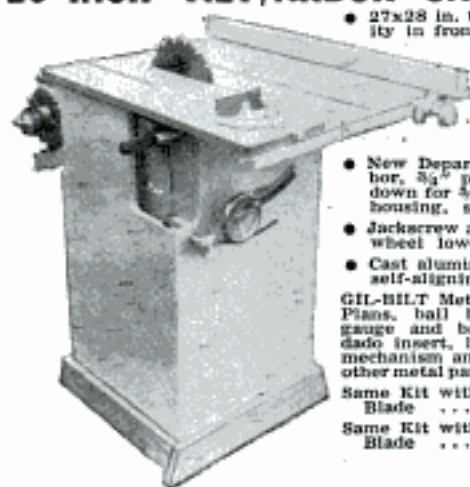
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PLANS only
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POSTPAID

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- 27x28 in. table, 13 1/4 in. capacity in front of blade

- 10 in. blade cuts 3 1/4 in. deep, tilts full 45-degree

- Floor model 34" high, table always stays level

- New Departure ball bearing arbor, 3/4" precision shaft turned down for 5/8" bore blades, alum. housing, shipped ready to run

- Jackscrew and 4 1/2 in. dia. hand-wheel lowers and raises blade

- Cast aluminum miter gauge and self-aligning rip fence guide

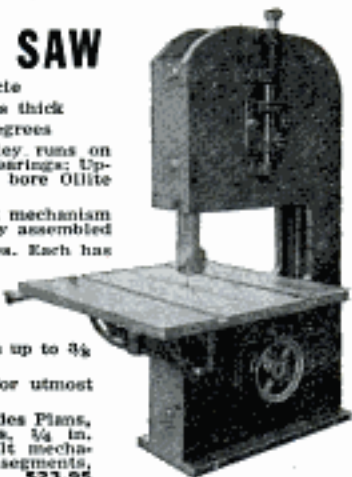
GIL-BILT Metal Parts Kit includes Plans, ball bearing arbor, miter gauge and bar, rip fence guide, dado insert, lock knobs, jackscrew mechanism and handwheel, and all other metal parts (less blade) **\$22.95**

Same Kit with 10" Combination Blade **\$25.90**

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- Cuts to center of 24 inch circle
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cushion is excellent. It fits the body better than a conventional car seat.

During my test there were bothersome gas fumes seeping into the cockpit.

The folding top could be improved. There were water leaks during a rainstorm. Also, the side-curtain arrangement is poor. Some sort of roll-up curtains or disappearing side windows would be an improvement.

The top can be raised in about five minutes with practice. When down, it is packed under a hinged cover behind the seats.

The doors should open wider, and the operating locks could be improved. The hood opens from the rear and is locked by two latches, one on each side of the cowl.

Like most sports cars, it is a little difficult to enter as the cowl extends quite far back.

Corvette is available only with Powerglide automatic transmission (with slight modification) and has a short shift lever in the floor at the right side of the driver's seat. If the throttle is held open, upshift takes place at 4500 revolutions per minute or about 55 miles per hour. Downshift below 48 miles per hour can be had by depressing the throttle and the car leaps forward with vigor.

Of course, most genuine sports-car lovers think a clutch and shift lever are necessary and do not like automatic transmissions. The Corvette, however, is not a true sports car. It definitely is not the type of sports car to be used in competition, although some Corvette owners report competition successes. (Only 18 percent of the owners belong to a sports-car club or group.) Acceleration is terrific even with the automatic transmission. Acceleration is faster from a standstill than the average driver could attain in the same car with conventional transmission. High performance does not lend itself to economy and the Corvette's three carburetors are not economizers. With the car just "begging" to be gunned, one is often inclined to forget economy anyway.

Both bumpers should be larger to afford more protection in traffic and parking. The 167-inch length makes for easy parking and the height of 51 1/2 inches at the windshield makes it a low, well-balanced car for high speeds and adds to its sleek appearance.

The Corvette body consists of a laminated construction of glass fibers impregnated and bonded by a clear plastic which when an activator is added, sets itself into a solid panel rather like plywood. The result is a very usable body, somewhat expensive, but of light weight. It stands up to abuse, will not rust, will not crumple

(Continued to page 364)

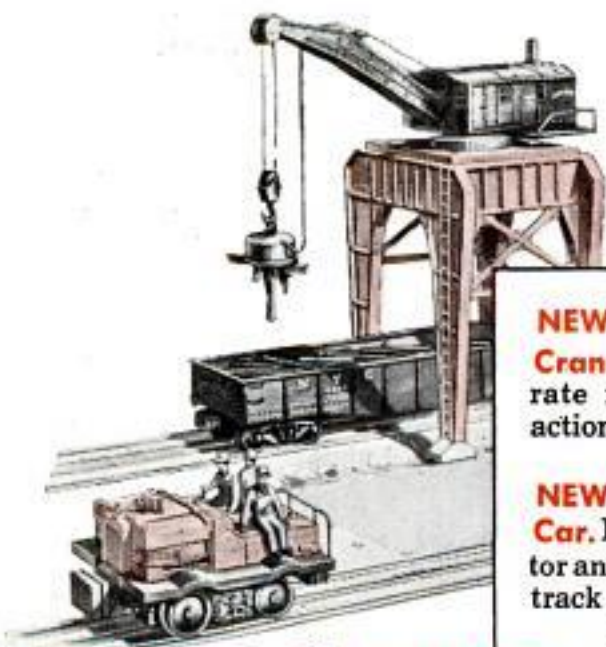
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A real powerhouse with two motors
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Scale detailing that reproduces not only the appearance but the action of the real thing . . . that's part of Lionel's undisputed leadership for over 50 years. Lionel Trains *look* and *act* the part! So do famous Lionel operating accessories. Only Lionel locos have *Magne-Traction* for speed, pull, climb and control. Real R. R. remote-control knuckle couplers on every car. See the newest of the world's finest trains at your Lionel dealer's.

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1. The new 44-page full-color Lionel catalog.
2. The new 5½" double-faced record of whistles, bells, railroad sound effects and Diesel horns.*
3. Lionel's special "Pop Persuader."

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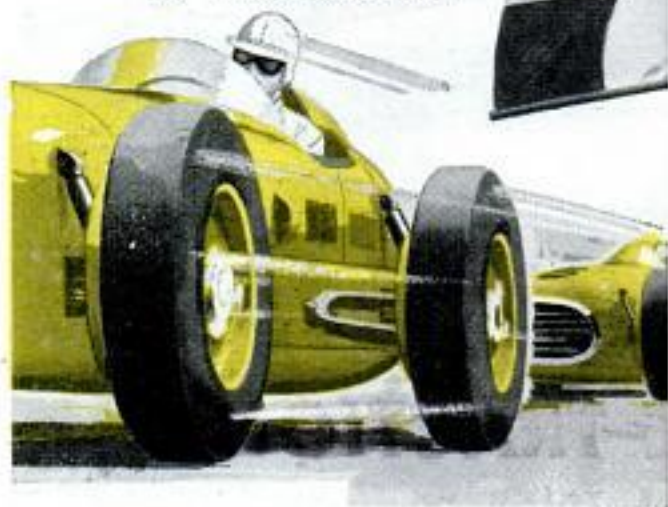
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*Plays on all 78 RPM phonographs except some spindle or automatic changers.

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"500" winner 1953 & 1954



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Jim Travers
Mechanic

What *Monro-Matics* do for Bill Vukovich's famous race car, they will do for your car. By automatically adjusting to every road and load condition, *Monro-Matics* give you better traction, more riding comfort, more all-round driving safety.

Now you can try *Monro-Matics* on your own car under Monroe's money-back guarantee. Ask your dealer, service station or garage about the Monroe 30-Day Free Ride Plan.



Send 10 cents for new Shock Absorber Manual. Tells the right shock for every car, gives instructions for removal and installation of Direct Action Shocks.

MONROE AUTO EQUIPMENT CO., Dept. M
MONROE, MICHIGAN

in a collision, will take a paint finish and is relatively free from drumming noise.

I really "beat" the Corvette over all kinds of high, mountainous terrain and winding roads. It is a fascinating car and a lot of fun to drive. It appeals to many buyers who are not the least bit interested in competition (only 8 percent have used their Corvettes in competition.) It might well be compared to the Mercer Raceabout, Stutz Bearcat, Kissell Gold Bug and the Auburn Speedster of bygone days in that, like these, it is a flashy car for everyday use and not a sports car designed especially for competition. Corvette is definitely a compromise—a semisports car. A lot of people think they want a sports car as they are interesting cars to operate and enjoy, but many lose sight of the fact that sports cars have limited luggage space, afford little protection from weather and require more work than the average American likes to do to raise the top and attach the side curtains, especially in event of a quick rain.

We've heard much about sports-car popularity in the United States but even with the most popular imported sports car (MG), sales amounted to only 7000 last year. It must be remembered that this total is about 1½ days' production of the regular Chevrolet cars—and Chevrolet produces about as many cars weekly as the 32,000 total sports cars imported into the United States last year. So perhaps the market is not so large as some think. Corvette production has been cut back from 1000 to 300 a month so apparently Chevrolet is finding this to be true. ★ ★ ★

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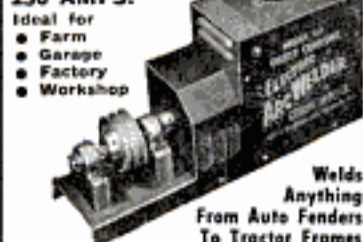
Replacement cost—\$300.00. Shipping Wt.—185 lbs. SPECIAL PRICE

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ITEM #65 For Stationary or Portable Use. **HEAVY DUTY RANGE TO 250 AMPS.**



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Welds Anything From Auto Fenders To Tractor Frames

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ITEM #126—Four-way open center control valve, with built-in adjustable relief valve factory set at 1000 P.S.I. Spring loaded neutral position. For use with one double acting cylinder. In neutral position cylinder is locked and pump unloaded. Can be used as single unit or mounted in series. Has 3/4" pipe thread inlet and outlet. 1/2" pipe thread cylinder ports. Finger grip handle. Ship. wt. 10 1/2 lbs.

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ITEM #41C1C • 2" Bore • 6" Stroke • Double Acting • All Steel • 3/8" Pipe thread ports. Lift capacity 3100 lbs. with 1,000 P.S.I. line pressure. Ship. wt. 12 lbs. F.O.B. Chicago. Price ea.....

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Monsters on Parade

(Continued from page 101)

all her machinery and fired guns hidden in her back. The shells consisted of pieces of candy attached to six-inch parachutes.

Just as spectacular as Hazel was the space ship. This marvel from another world weighed more than 10 tons and was 60 feet long.

The space ship, oddly enough, was built around a popcorn ball. Members of the committee decided, first of all, that they wanted to give something away to the kids in the crowd. They measured the parade route and calculated they'd need one popcorn bullet per foot on each side of the route. This meant they'd need 10,000 popcorn balls. They then sat down to plan a vehicle that would hold and fire that volume of ammunition. The space ship was the result.

On each side of the ship was a blister with six lights that were tripped in succession by a switch, producing the illusion that the ship was moving at interplanetary speed. A jet shot out the rear, accompanied, as one worker said, by sounds of "disintegration and atomic discombobulation."

Every minute or so a robot man would pop up out of the ship, his antennas glowing, head and arms moving as he checked the guns and the effect of the bombardment.

Built into each side of the ship were four rocket guns that fired popcorn balls automatically at the rate of 312 each minute over the entire parade route. Every time the eight guns fired, eight long fluorescent tubes beneath the barrels flashed. Spectators were sure that somehow those magicians at General Electric were managing to fire popcorn balls out of lighted fluorescent tubes!

Skilled workers donated a total of 3590 man-hours of their free time to build the space ship, which had an actual parade life of only a half hour. But ask the kids of Pittsfield whether the sight was worth the effort and their eyes will gleam like disintegrator guns. Ask the sweeper who told the executive how to go about building the papier-maché clouds and he'll tell you the boss is interested in fishing and raking his lawn and bragging about his kids the same as anybody else.

Right now, in the General Electric shops at Pittsfield, they're dreaming up some new floats for this year's parade. No telling what they'll be. Residents of the town can't believe that Pitt the Dragon, Hazel the Witch or the space ship can be beat. Members of the committees are just keeping mum—behind some mighty mysterious smiles.

★ ★ ★

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MAGNI-FOCUSER

Has fine ground lenses of optical glass. Neutralizes eye strain from close work. Twin lens, binocular design gives third dimension vision. Allows freedom of both hands. Can be worn over glasses. Ideal for gunsmith, diamond, artist, etc.

MAGNI-FOCUSER SIZES

focal length	power	price each
20"	1½x	1050
14"	1¼x	
10"	2¼x	
8"	2½x	

IMPORTED 7PC. DRAW KIT

Only 329



A bargain for the student, draftsman, architect, etc. Has a 4-1/2" divider, a 4-1/2" compass with pen & pencil parts, a 3-1/2" reverse bow compass for pencil and ink, a 4-1/2" ruling pen, capsule of extra leads. All in a velvet lined case.

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A set the artist or draftsman should not be without. Draw perfect ellipses every time. Has projections of 20, 30, 45 and 60 degrees. Ellipses range from 3/8" to 3-3/4" on a major axis. Size: 4½ x 9½"

675



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For Rockhounds, Prospectors, etc. Specially made for and imported by us. Has precision ground & polished lenses. Moisture proof. With 30, 45 and 60 power adjustable magnification.

375



AMAZING NEW MICROSCOPE TELESCOPE

A new optical development. A pocket size Microscope-Telescope. When closed it serves as a 50 POWER Microscope, when opened out it acts as a full 10 POWER Telescope. Only inexpensive Japanese labor can make this price possible.

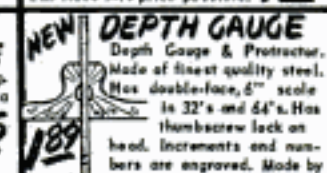
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200 PSI OIL PRESSURE GAUGE

Made by Marshalltown Mfg. Reads 0 to 200 PSI. Has a 3-1/2" white face. Has 28" hose with fittings. Steel case.

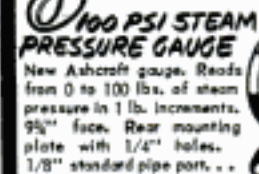
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189



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695



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Made of top quality steel. 15" long. Ideal for cleaning brush, etc. Comes complete with sturdy belt sheath.

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A Government Surplus Bargain. Completely Reconditioned. Motor rewound and checked for serviceability. Ready to run. Satisfaction guaranteed. A \$20.00 VALUE

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395

HY-SCORE .22 CAL. AIR RIFLE

Made in Belgium for Hy-Score. Needs no pumping, just cock and fire. Has ALL STEEL fully rifled barrel, 17½" long. A beautiful natural finished, hardwood stock. Shoots .22 cal. pellets or darts. An excellent training rifle. Ideal for indoor or outdoor use. Length 40½". Weight, 5 lbs.

SAVE 800

1800 VALUE

1095

TERMS SEE OUR AD ON OPPOSITE PAGE

VALLEY-5 DEPT PM-6, 2263 E. VERNON AVE., LOS ANGELES 38, CALIF.

PORTABLE WINCH HOIST

LIFTS 1500 POUNDS
Made for U.S. Navy Bureau of Ordnance as a Bomb Hoist. Has a 21 to 1 gear ratio. 40' tubular wire extension with a 3" pulley on the end. Drum has 12 ft. of 3/16" high tensile strength steel cable. The operating handle has a catch brake ideal for "swing about" truck or platform loading. **2750**
A \$125.00 Surplus Value.

2500 LB LIFT HOIST 2950
WITHOUT MOUNT

500 VALVE
We've sold hundreds of these to garages, machine shops, truckers, boat yards and boat owners, etc. Has a 2500 lb. capacity through a 24 to 1 gear ratio. Had bronze worm gear drive. 18 feet of high tensile, steel cable, 3/16" in diam. Originally used as Bomb Hoist.

MOUNTING FRAME 300
Specially designed and engineered for the above winch. Allows an easy universal mount. Frame ONLY

RIGHT ANGLE DRIVE 225
Has direct 1 to 1 ratio through 90° level gears. Drive & take-off shafts are 3/8" diameter. Gears are self-lubricating, hi-speed steel. Ideal for use on power tools, flux drives, etc. Size: 3 1/2" x 2 1/4" x 1 1/2".

180° OFFSET DRIVE 675
For use where tremendous power at low take-off RPM is desired. Drives through a chain of 6 gears, rotating on self-lubricating, hi-speed roller bearings. Has an 85 to 1 gear ratio. Take-off shafts are 3/2" and 3/8" diameter. USED

GEAR BOX 495
The popular "T" drive. Output shafts are at right angles to input shaft. Ratio is 1 to 1. Shafts are 3/4" dia., & are full bearing mounted. Has 3 1/2" sq. flange mount.

GEAR BOX 595
Angle drive type with 1 input and 2 output shafts. Output shafts have universal joint fitting. Input dia., 1 1/2". Gear ratio is 1 to 1. Full bearing mounted. Overall size: 10" x 6" x 4". Mounts with 4, 1/2 x 4" bolts.

6 PC. TUBE BENDER SET 249
For bending copper, aluminum and other thin wall tubing by hand. Of special spring wire coil. Cadmium plated. Set includes sizes for 1/4", 5/16", 3/8", 7/16", 1/2" and 5/8" tubing. A \$5.00 value.

AMAZING 100-200-300 POWER MICROSCOPE 949
Compares to instruments selling up to \$75.00. Has a triple, revolving turret with 100-200-300 Power objective lenses. These lenses are achromatic - fully precision ground and polished. All-metal body is built to incline through 60°. Has adjustable plano sub-stage mirror. Comes in a handsome, dorretailed hardwood case. Ideal for amateur scientist, student, home lab, schools, etc. Order Today!

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This selected **LUAN MAHOGANY PLYWOOD** is WEATHER and WATER RESISTANT. Bonded with the finest Ureol Formaldehyde Resin Adhesive. Rotary cut for beauty of grain with both sides sanded and ready for use. Face side is unjointed. Ideal for paneling dens, offices, hotels, theatres, etc. Also ideal for the finest cabinet work, furniture, etc. Comes in 2 panel sizes: 4h. x 8h. x 1/4" and 3ft. x 6ft. x 3mm (approx. 1/8") thick. Order TODAY and SAVE!

3ft. x 6ft. x 3mm approx. 1/8" **179**
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Install your own. All you need is a knife or saw, a spade and the special plastic cement included with each order. System has plastic flexible pipes and will go around the trees, under walks, etc. Dig a trench, thread no pipes - just slit ground with spade, slip pipe in, press seal back attach to water supply & you're ready to go. The system includes 100 ft. of Eastman Kodak "TENITE" plastic pipe - guaranteed for 25 years against rust, rot, corrosion, etc. Also 10 solid brass adjustable sprinkler heads, all necessary fittings, cement and instructions for use. **2995**

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Has 20" hardwood handle. Blade folds to form a pick. G.I. Surplus.

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EASTMAN AERO EKTAR F2.5 coated lens with a 7" focal length. Precision made for Air Corps. Has diaphragm markings from f:2.5 to f:16. Perfect color correction, also ideal for black & white. Complete with heating element, dust cap, clear filter, orange filter and an adapter. A \$200 VALUE **6950**

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A Super Fine Quality at Less Than Mfr's Cost. Only Gov't Surplus could offer you this value! Ideal for fine strainer work. Absolutely insect proof.

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New condition. Full guarantee. Perfect plants. Latest models. Shipped prepaid to you.

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● Brand new. General Electric and Bendix dual voltage units. Use for welders, fast battery chargers, lights, stoves, etc. Generates 115-v. 2000-W, 800-c AC, 30-v, 200-amp DC. Govt. cost over \$300.

- SALE \$29.48 Prepaid
- Same as above except 125 amp instead of 200. SALE \$23.91 Prepaid



ARMY WINCH-HOIST

● Amazing value. Lifts 1500 lbs. 21-lb-1 ratio gears, automatic brake, 12-ft. lift. Complete with 3/16" steel cable. Use with or without extension arm. Makes wonderful hoist for garages, rear end swing-around mtg. for trucks, etc. Govt. cost over \$125.

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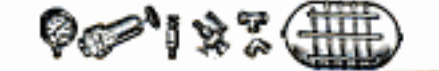
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- Super Special. Cylinder. (Precision) 1 1/2" bore x 4" stroke, Govt. Cost \$87. Sale \$1.95 ea.



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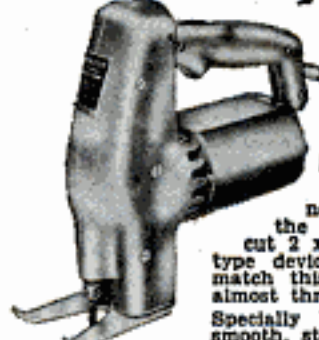
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does the work of a RIP... CROSS CUT... COPING... JIG... SCROLL... BAND and KEYHOLE SAW CUTS ANY MATERIAL! SAWS ANY SHAPE!

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Specially built Dayton motor assures smooth, steady cutting. A built-in compressor blows sawdust away from guide line.

SPECIFICATIONS

● 4 to 1 gear reduction. ● All gears hardened steel. ● Motor exposed for cool running. ● Oilite bronze bearings. ● Air is pumped from top down through the center section, cooling unit as well as blowing sawdust from line.

IT CUTS wood — plastics — metals — Complete with 5 different blades composition boards — hard rubber and \$48.00 others.

IT SAWS circles — curves — straight lines — intricate designs.

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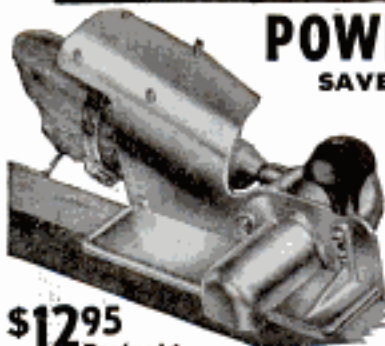
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POWER PLANNER

SAVES TIME AND WORK ON MANY JOBS



\$12.95
Postpaid

Ideal for fitting doors, screens, storm windows; smoothing rough edges of lumber; handy in cabinet work. Planes wood up to 2" wide.

Exclusive Attaching Feature gives perfect alignment and holds planer and drill firmly together. Changes on and off quickly. Extra

SANDING ATTACHMENT for Planer and 2 sanding drums. \$1.00 extra.

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A Hack Saw, Jig Saw and Coping Saw in one easy to use attachment. Cuts metal, wood, plastic, hardboard, etc. Full 9/16" chip clearance. No gears, no bearings to wear out. Ideal for sawing in hard-to-reach places. Weighs only 11 oz.

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Cut large holes—quickly, perfectly

Cuts holes 1", 1 1/2", 2", 2 1/2" diameters up to 3/4" deep. The four circular blades slip into grooves of alloy saw body and are firmly held by set screw. A 1/4" drill bit anchored in saw body guides saw blades and prevents tool from "jumping." High carbon steel blades cut wood, plastic and metals.



\$4.95

Complete with 4 saw blades (8 or 14 tooth) and 1/4" drill bit—Specify for wood or metal cutting when ordering. Postpaid.

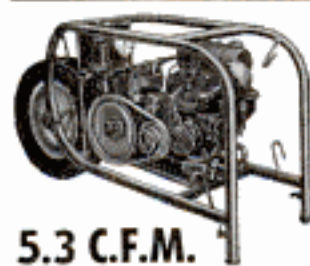
Every Aladdin Attachment Tool **GUARANTEED SATISFACTORY** or Money Back. Will ship C.O.D. plus postage. Literature available on all attachments. **DEALER INQUIRIES INVITED.**

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SURPLUS! NEW Gov. Release!
Original Gov. Cost \$350.00

The Finest 2-H.P. TWIN CYLINDER Industrial Unit Ever Built! Fully Guaranteed
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200 lb. PRESSURE



Maintains 40 to 65 lb. pressure for **CONTINUOUS** spraying (no waiting 'til tank keeps building up)

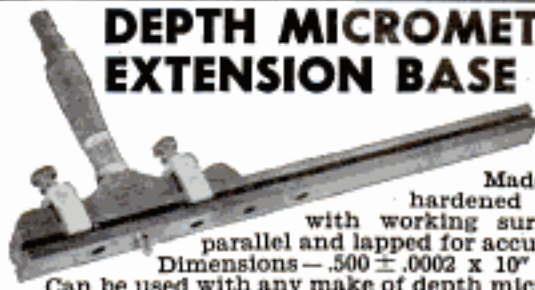
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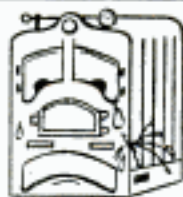
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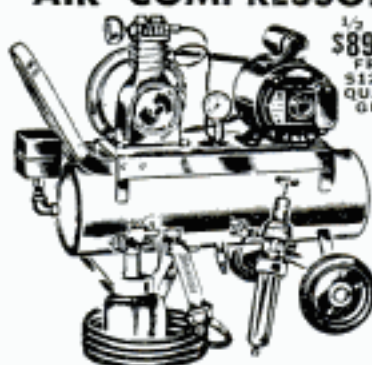
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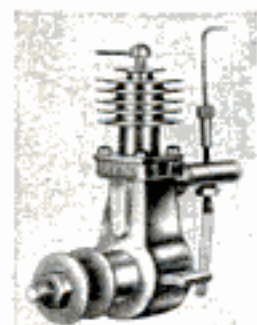
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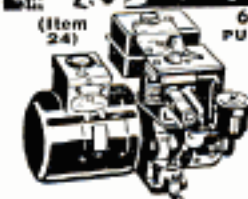


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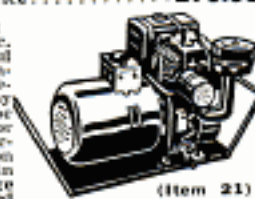
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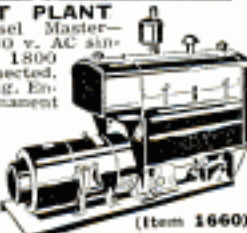


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(Item 1660) Diesel Master—11-12 kw. 115/230 v. AC single or 3 phase. 1800 rpm direct connected. Electric Self-starting. Engineered for permanent power where continuous low-cost, heavy duty service is important. Wt. 1350 lb. Reg. list \$3650.00. Factory price..... **\$1895.00**



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GAS DRIVEN PLANT, 10-11 kw. 115-230 v. 60 cyc. AC. single or 3 phase, powered by 4 cylinder Wisconsin air cooled engine. Belt driven. Simple, reliable, 3 V-belt drive mounted on rugged steel skid. (Item 217) (with crank start) **\$1075.00**
Wt. 300 lb. Factory price..... **\$1145.00**
Same plant with self-starter.....

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(Item 10) Easy installed in furnace pipes. Forces even heat to all rooms. Over range removes kitchen smoke and odors. Powerful, continuous duty motor. 110-120 v. AC. Mount in wall or ceiling to ventilate any area. Quiet, super-efficient fan moves huge volume of air. (400 to 600 CFM).
8" Fan, wt. 5 lb. **\$6.85**
9" Fan, wt. 6 lb. **\$7.85**
10" Fan, wt. 7 lb. **\$8.85**
12" Fan, wt. 8 lb. **\$9.85**
HEAVY DUTY FAN. Semi-enclosed motor, suitable for spray booths, restaurant exhausts, poultry houses, etc. 10" Fan, wt. 8 lbs. (Item 10E)..... **\$11.95**
12" Fan, wt. 10 lbs. (Item 10D)..... **\$12.95**



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Very flexible and tough; Neoprene. Ideal for lawn mowers, hedge trimmers and power tools. U.L. approved. Complete with heavy rubber plug and outlet. 40 ft. cord (Item 17A) Wt. 2 1/2 lbs. regularly \$4.95—SPECIAL... **\$2.95**
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9 TON HYDRAULIC PRESS

A tremendously powerful hydraulic press, capable of exerting 18,000 lbs. pressure. Pays for itself many times over—straightening bent connecting rods, king pins, crankshafts, axles, link pins and bars—or pushing out frozen bearings and bushings. Developed pressure under precise control and visible at all times on accurate gauge. Complete with both large and small anvils and jigs to straighten any kind of curve or bend. (Item 464) Wt. 110 lb. Actual list price \$365. Our special close-out price..... **\$69.50**



MASTER SHOP COMPRESSOR

Big and rugged. This stationary compressor provides 8 c.f.m.—plenty of air for industrial uses, powered by heavy duty repulsion induction 3/4 HP, 115/230 v. motor. Factory type twin cylinder compressor designed for continuous operation. Mounted on heavy 22 gal. steel tank. Complete with unloader type automatic switch, pressure relief valve, type valve, gauge, shut-off valve, and 20 ft. heavy duty air hose. (Item 209B) **\$174.50**
Regular retail \$319.50. Factory price.....



JET FLOW BLOWER

Tremendous air movement (1800 CFM) and quiet operation make this double inlet 10" turbine blower unbeatable for heating, cooling, drying and air conditioning. Ideal for attic or barn ventilation, converting gravity heating to forced air; spray booth exhausts, etc. Operates with any 1/4, 1/2 or 3/4 HP motor. Over-sized, long life bearings. Includes variable speed motor pulley and belt. Dimensions 19" h x 8" x 16 1/2". Outlet opening 13" x 11 3/4". Wt. 45 lbs. Item 245. Reg. \$54.50. **\$27.50**
Factory Special.....
HEAVY DUTY 1/4 HP motor for above **\$16.95**
12" TURBINE BLOWER similar to above, but larger with 2400 CFM capacity. Wt. 65 lbs. (Item 245A) Reg. \$70.00. Factory Spec. **\$34.50**



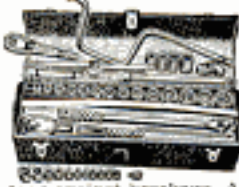
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Completely self-priming! No foot valve required. Tremendous capacity—100 gal. per min. 1" Special impeller enables pump to handle muddy or sandy water. Simple to operate—simply start engine and watch the water go. Powered by a rugged, easy-starting 2 HP Briggs engine. Pre-lubricated sealed bearings for years of heavy low-cost service. Big 1 1/2" Model. Item 302. Wt. 70 lbs. **\$134.50**
Factory price.....
2" Model (150 gal. per min.) with 2 1/2 HP engine. Item 302A. 90 lbs. Fact. Spec. **\$154.50**



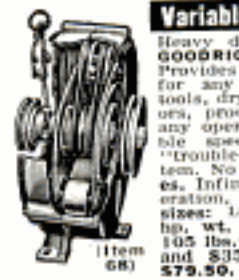
52 pc. SOCKET SET

Highest quality, guaranteed non-breakable sockets made by Husky. Beautifully matched chrome finish alloy absolutely the best. Contains a complete set of 22 sockets in 1/2" drive, 3/4" drive and 1 1/4" drive, plus all necessary extensions, handles, speeders, reversible ratchets, etc.; all uncond. guaranteed against breakage. A beautiful set of tools that will handle any job in a big doghouse steel box. Wt. 17 lbs. (Item 25) **\$27.95**
List price \$42.90. Factory special.....



44 PC. SOCKET SET

(Item 306) Same unconditionally guaranteed, non-breakable sockets as above. Complete range of 21 sockets from 1/4" thru 7/16" (1/4" drive) & 7/16" thru 1-1/16" (3/4" drive). Two extensions, reversible 1/2" ratchet, 3 drive punches, sliding "T" head, all angle coupling, 1/2" speeder, 1/2" breaker, 5 pc. high chrome alloy combination wrench set and 8 pc. offset wrench set in big doghouse tool box with ample room for other tools. **\$21.95**
Reg. \$49.50. Wt. 16 lb.



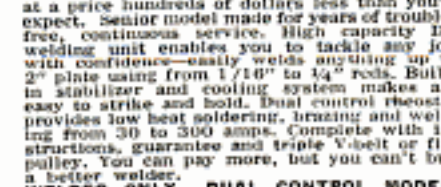
JET STEAM MASTER

Now, a new super-efficient portable steam generator that provides live steam at 100 lbs. pressure in 60 seconds from a cold start! The first quality steam blower ever offered at this low price. Instantly cleans, sticky grease, dirt, rust, old paint, etc. off motors—farm implements and road machinery. Pays for itself in a few weeks. Sterilizes as it cleans — milk equipment, etc. Fully automatic—oil fired with built-in water circulating pump. Draws water from faucet or bucket. Simple and safe: anyone can use it—built-in safety valve. New triple efficiency jet steam gun automatically mixes in soap or detergent if desired. Wt. 250 lbs. Item 463. Special **\$298.00**
Factory Price.....



MASTER DC ARC WELDERS

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30.1 Wt. 110 lbs. \$49 value.....
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Wt. 110 lbs. \$400 value. Special.....
COMPLETE POWER MASTER (Illustrated above) powered by a 14 HP, air cooled Wisconsin engine. Wt. 480 lbs. (Item 280) Compares with welder costing \$1200. **\$399.50**
Special for October only.....
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